

Appendix E – Hydraulic Modeling Information

TECHNICAL MEMORANDUM

RE: Hydraulic Profiles for Theresa Street and Northeast WWTP

TO: Drury Whitlock

FROM: Mark Richards

DATE: August 28, 2001

Theresa Street – East Side

Calibration: Calibration was performed at 22.5 mgd through existing system. (15 mgd through Eastside and 7.5 mgd through Westside)

RAS: 50 percent RAS flow of baseflow was assumed.

Aeration Recirculation: No aeration recirculation was included for calibrations. 8-mgd aeration recirculation was used for the capacity runs.

Capacity: Capacity runs were performed at 16.6, 20, 26.6, and 33.4 mgd through the Eastside.

Conclusion: This section was very difficult to calibrate. Many of the water surfaces in the hydraulic profile appear to be speculative, and require entering friction coefficients well outside of the range of normal operations.

Summary of Results

Element	Flow (mgd)	Weir Elev. (ft)	Top of Wall Elev. (ft)	Water Surface (ft)
Final Junction MH	16.6		46	45.06
	20			45.18
	26.6			45.69
	33.4			45.92
Final Channel in Chlorine Tank (below weir)	16.6	45.33	47.5	45.71
	20			46.13
	26.6			47.37
	33.4			48.53
Initial Channel in Chlorine Tank	16.6		47.5	46.49
	20			46.90
	26.6			47.94
	33.4			49.10
Distribution Box No. 2	16.6		48	46.93
	20			47.38
	26.6			48.77
	33.4			50.43
Launder in Final Clarifier (below weir)	16.6	48	49.5	47.08
	20			47.56
	26.6			49.07
	33.4			50.91
Weir in Final Clarifier (above weir)	16.6	48	49.5	47.97
	20			47.98
	26.6			49.07
	33.4			50.91

Element	Flow (mgd)	Weir Elev. (ft)	Top of Wall Elev. (ft)	Water Surface (ft)
End of Aeration Basin (below weir)	16.6	50.33	56.5	48.65
	20			48.96
	26.6			50.82
	33.4			53.64
Initial Basin in Aeration Basin	16.6		56.5	51.44
	20			51.50
	26.6			51.66
	33.4			53.65
Launder in Primary Clarifier (below weir)	16.6	54.0	55.5	52.34
	20			52.46
	26.6			52.67
	33.4			54.48
Weir in Primary Clarifier (above weir)	16.6	54.0	55.5	53.94
	20			53.94
	26.6			53.96
	33.4			54.48
Distribution Box No. 1	16.6	56.75	61.5	54.34
	20			54.53
	26.6			55.00
	33.4			56.11
Final Channel in Aerated Grit Basin (below weir)	16.6	58.75	61.5	58.61
	20			59.28
	26.6			60.95
	33.4			63.05
Initial Channel in Aerated Grit Basin (above weir)	16.6	60.5	61.5	61.40
	20			61.52
	26.6			61.89
	33.4			63.38

Major Elements:

Final Junction MH

Channel in Chlorine Tank : water surface was less than 0.5 ft from top of wall at 26.6 mgd

Final Clarifier : the water surface was within 0.5 ft of top of wall at 26.6 mgd and overflowed wall at 33.4 mgd. The initial channel overflowed wall at 20 mgd.

Distribution Box No. 2: water surface overflowed wall at 26.6 mgd

Final Clarifier : water surface was within 0.5 ft from top of wall at 26.6 mgd and overflowed wall at 33.4 mgd. Launder and weir are submerged at 26.6 mgd

Aeration Basin: final weir is submerged at 26.6 mgd

Primary Clarifier Launder and weir are submerged at 33.4 mgd

Distribution Box No. 1: no problems at 33.4 mgd

Aerated Grit Basin . Final weir is submerged at 20 mgd and water surface overflowed top of wall at 20 mgd in the initial channel.

Theresa Street – West Side

Calibration: no calibration was performed, as there was no water surface data against which to calibrate.

RAS: 50 percent RAS flow of baseflow was assumed.

Aeration Recirculation: Assuming no internal recirculation

Capacity: Capacity Runs were performed at 7.5, 10.0, 12.5, and 15.0 mgd.

Conclusion: Since no data was available from which to calibrate, the results of the is hydraulic profile should no be used for design or operation purposes. Typical friction loss coefficient values were chosen.

Summary of Results

Element	Flow (mgd)	Weir Elev. (ft)	Top of Wall Elev. (ft)	Water Surface (ft)
Final Junction MH	7.5		46	45.0
	10.0			45.18
	12.5			45.42
	15.0			45.70
Final Channel in Chlorine Tank (below weir)	7.5	45.33	47.5	45.53
	10.0			46.13
	12.5			46.89
	15.0			47.82
Initial Channel in Chlorine Tank	7.5		47.5	46.38
	10.0			46.90
	12.5			47.52
	15.0			48.39
Distribution Box No.1	7.5		48	46.73
	10.0			47.38
	12.5			48.27
	15.0			49.47
Junction Box (after Final Clarifier)	7.5			46.75
	10.0			47.42
	12.5			48.33
	15.0			49.55
Launder in Final Clarifier (below weir)	7.5	49.25	51.0	47.52
	10.0			47.56
	12.5			48.44
	15.0			49.69
Weir in Final Clarifier (above weir)	7.5	49.25	51.0	49.21
	10.0			49.22
	12.5			49.22
	15.0			49.69
Channel Junction Box (next to overflow)	7.5	53.0	55.0	49.44
	10.0			49.63
	12.5			49.87
	15.0			50.62
End of Aeration Basin (below weir)	7.5	53	55.0	49.60
	10.0			49.92
	12.5			50.32
	15.0			51.27

Element	Flow (mgd)	Weir Elev. (ft)	Top of Wall Elev. (ft)	Water Surface (ft)
Initial Basin in Aeration Basin (below weir)	7.5		55.0	53.5
	10.0			53.63
	12.5			53.76
	15.0			53.88
Distribution Box above Aeration Basin (next to overflow)	7.5	55.5	57.5	53.55
	10.0			53.71
	12.5			53.89
	15.0			54.07
Launder in Primary Clarifier (below weir)	7.5	57.4	58.5	56.11
	10.0			56.21
	12.5			56.31
	15.0			56.42
Weir in Primary Clarifier (above weir)	7.5	57.4	58.5	57.41
	10.0			57.42
	12.5			57.43
	15.0			57.43
Final Channel in Aerated Grit Basin (below weir)	7.5		60.86	57.50
	10.0			57.57
	12.5			57.66
	15.0			57.77
Initial Aerated Grit Basin	7.5		60.86	60.83
	10.0			60.91
	12.5			60.98
	15.0			61.06

Major Elements

Final Junction MH : water surface is less 0.5-ft from top of wall at 15.0 mgd

Chlorine Tank : water surface in main channel overflowed wall at 15.0 mgd and overflowed wall at 12.5 mgd in initial channel

Distribution Box No.1: water surface overflowed wall at 12.5 mgd

Junction Box (after Final Clarifier): more data on top of wall elevation is needed.

Final Clarifier launder and weir are submerged at 15.0 mgd

Channel Junction Box: no problem at 15.0 mgd

Aeration Basin : no problem at 15.0 mgd

Distribution Box : no problem at 15.0 mgd

Primary Clarifier : no problem at 15.0 mgd

Aerated Grit Basin : water surface overflowed wall at 10.0 mgd

Northeast WWTP

Calibration: calibration was performed at 16 and 8 mgd against the flows shown on the hydraulic profile.

RAS: A 50 percent RAS flow rate of the base flow was assumed through the aeration basins.

Aeration Recirculation: No recirculation though the aeration was used.

Tower Recirculation : 12 mgd recirculation through the tower was run with 8 mgd and 4 mgd was run with 16-mgd baseflow. For the capacity runs 25 percent of the baseflow was used.

Capacity: Capacity runs were run for 20 ,35, and 50 mgd. Area highlighted in yellow are problem areas.

Conclusion: This process train calibrated well when typical friction loss coefficients were used.

Summary of Results:

Element	Flow (mgd)	Weir Elev. (ft)	Top of Wall Elev. (ft)	Water Surface (ft)
Final Junction MH	20		33.5	31.84
	35			32.01
	50			32.28
Final Channel in Chlorine Tank (below weir)	20	33.25	35.75	32.16
	35			33.01
	50			34.32
Mixing Channel in Chlorine Tank	20		35.75	33.90
	35			34.20
	50			34.77
Launder in Final Clarifier (below weir)	20	35.75	37.25	34.32
	35			34.83
	50			35.64
Weir in Final Clarifier (above weir)	20	35.75	37.25	35.81
	35			35.87
	50			35.91
Channel in Final Distr. Box	20		41.0	36.03
	35			36.52
	50			37.24
End of Aeration Basin (below weir)	20	37.25	40.2	36.23
	35			37.15
	50			38.53
Prim. Distribution Box (below weir)	20	38.5	42.0	37.51
	35			37.94
	50			40.02
Tower (water above floor)	20		Bottom of media = 42.0	40.68
	35			41.32
	50			43.62
Launder in Primary Clarifier (below weir)	20	39.75	41.25	38.46
	35			39.03
	50			39.51
Weir in Primary Clarifier (above weir)	20	39.75	41.25	39.74
	35			39.77
	50			39.81

Element	Flow (mgd)	Weir Elev. (ft)	Top of Wall Elev. (ft)	Water Surface (ft)
Final Channel in Aerated Grit Basin (below weir)	20	40.75	42.5	39.84
	35			40.08
	50			40.42
Aerated Grit Basin (above weir)	20	40.75	42.5	41.24
	35			41.46
	50			41.65
Parshall Flume	20		45	43.91
	35			45.05
	50			46.06

Major Elements

Final Junction MH : Appears to have no problem at 50 mgd

Chlorine Tank: final weir was submerged at 50 mgd

Final Clarifier : Launder and weir are submerged at 50 mgd

Final Distribution. Box : no problem at 50 mgd

Aeration Basin : final weir is submerged at 50 mgd

Primary Distribution Box : weir is submerged at 50.0 mgd

Tower: water surface is greater than bottom of media at 50 mgd

Primary Clarifier : no problems at 50.0 mgd

Aerated Grit Basin : no problems at 50 mgd

Parshall Flume: water surface upstream of flume is greater than top of wall at 35.0 mgd.

HYDRAULIC ANALYSIS - PROFILE® MODEL

Theresa Street Eastside 22.5 MGD Model Input (Example)
Theresa Street Eastside 22.5 MGD Detailed Output (Example)
Theresa Street Eastside 22.5 MGD Summary Output
Theresa Street Eastside 25.0 MGD Summary Output
Theresa Street Eastside 30.0 MGD Summary Output
Theresa Street Eastside 40.0 MGD Summary Output
Theresa Street Eastside 50.0 MGD Summary Output
Theresa Street Westside 7.5 MGD Summary Output
Theresa Street Westside 10.0 MGD Summary Output
Theresa Street Westside 12.5 MGD Summary Output
Theresa Street Westside 15.0 MGD Summary Output
Northeast Influent to Before Tower 8.0 MGD Summary Output
Northeast Influent to Before Tower 16.0 MGD Summary Output
Northeast Influent to Before Tower 20.0 MGD Summary Output
Northeast Influent to Before Tower 35.0 MGD Summary Output
Northeast Influent to Before Tower 50.0 MGD Summary Output
Northeast Tower to Outfall 8.0 MGD Summary Output
Northeast Tower to Outfall 16.0 MGD Summary Output
Northeast Tower to Outfall 20.0 MGD Summary Output
Northeast Tower to Outfall 35.0 MGD Summary Output
Northeast Tower to Outfall 50.0 MGD Summary Output

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\EASTSI~1.SUM
 BBBBBB CC Data file: C:\PROFIL~2\EASTSI~1.PRO
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC EAST SIDE 1971
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By: MARK RICHARDS

PLANT FLOW = 38.68 CFS OR 25.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A740	FIRST CHANNEL IN GRIT CHAM	61.40	61.40
A650	CHANNEL IN AERATED GRIT TANK	59.76	59.76
A610	FINAL CHAN IN AERATED GRIT CHA	58.61	58.61
A580	FIRST CHANNEL IN DIST BOX #1	57.22	57.22
A565	CHANNEL AFTER WEIR IN DIST BOX	54.34	54.34
A510	WEIR PLATE IN PRIMARY CLR FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	53.94 1.49 53.83	53.94
A500	EFFLUENT LAUNDER IN PRIMARY CL	52.34	52.34
A490	DROP BOX AFTER PRIM CLR	51.61	51.61
A450	ZONE#1 IN AEARATION BASIN	51.42	51.44
A380	ZONE 3 IN AEARION BASIN	50.65	50.65
A320	MIXED LIQUOR CH IN AERATION BA	48.65	48.65
A270	WEIR PLATE IN FINAL CHL FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	47.97 .75 47.83	47.97
A260	COLLECTION LAUNDER IN FINAL CH	47.08	47.08

A255	DROP BOX AFTER FINAL CLR	47.02	47.02
A210	DIST BOX #2	46.92	46.93
A180	FIRST CHANNEL IN CHL TANK	46.59	46.59
A150	1ST PASS IN CHL TANK	46.49	46.49
A80	FINAL CHANNEL IN CHL TANK	45.71	45.71
A40	JUNCTION BOX BEFORE CREEK	45.05	45.06

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\EASTSI~2.SUM
 BBBBBB CC Data file: C:\PROFIL~2\EASTSI~3.PRO
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC EAST SIDE 1971
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By:MARK RICHARDS

PLANT FLOW = 46.42 CFS OR 30.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A740	FIRST CHANNEL IN GRIT CHAM	61.52	61.52
A650	CHANNEL IN AERATED GRIT TANK	59.99	59.99
A610	FINAL CHAN IN AERATED GRIT CHA	59.28	59.28
A580	FIRST CHANNEL IN DIST BOX #1	57.28	57.28
A565	CHANNEL AFTER WEIR IN DIST BOX	54.53	54.53
A510	WEIR PLATE IN PRIMARY CLR FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	53.94 1.37 53.83	53.94
A500	EFFLUENT LAUNDER IN PRIMARY CL	52.46	52.46
A490	DROP BOX AFTER PRIM CLR	51.74	51.75
A450	ZONE#1 IN AEARATION BASIN	51.48	51.50
A380	ZONE 3 IN AEARION BASIN	50.72	50.72
A320	MIXED LIQUOR CH IN AERATION BA	48.96	48.96
A270	WEIR PLATE IN FINAL CHL FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	47.98 .27 47.83	47.98
A260	COLLECTION LAUNDER IN FINAL CH	47.56	47.56

A255	DROP BOX AFTER FINAL CLR	47.52	47.52
A210	DIST BOX #2	47.38	47.38
A180	FIRST CHANNEL IN CHL TANK	46.90	46.90
A150	1ST PASS IN CHL TANK	46.75	46.75
A80	FINAL CHANNEL IN CHL TANK	46.12	46.13
A40	JUNCTION BOX BEFORE CREEK	45.18	45.18

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\EASTSI~3.SUM
 BBBBBB CC Data file: C:\PROFIL~2\EASTSI~4.PRO
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC EAST SIDE 1971
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By:MARK RICHARDS

PLANT FLOW = 61.89 CFS OR 40.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A740	FIRST CHANNEL IN GRIT CHAM	61.89	61.89
A650	CHANNEL IN AERATED GRIT TANK	61.14	61.14
A610	FINAL CHAN IN AERATED GRIT CHA	60.94	60.95
A580	FIRST CHANNEL IN DIST BOX #1	57.39	57.39
A565	CHANNEL AFTER WEIR IN DIST BOX	54.99	55.00
A510	WEIR PLATE IN PRIMARY CLR FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	53.96 1.16 53.83	53.96
A500	EFFLUENT LAUNDER IN PRIMARY CL	52.67	52.67
A490	DROP BOX AFTER PRIM CLR	52.09	52.11
A450	ZONE#1 IN AEARATION BASIN	51.63	51.66
A380	ZONE 3 IN AEARION BASIN	51.05	51.05
A320	MIXED LIQUOR CH IN AERATION BA	50.82	50.82
A270	WEIR PLATE IN FINAL CHL WEIR SUBMERGED, W.S. DS V-NOTCH INVERT	49.07 49.07 47.83	49.07
A260	COLLECTION LAUNDER IN FINAL CH	49.07	49.07

A255	DROP BOX AFTER FINAL CLR	49.00	49.01
A210	DIST BOX #2	48.76	48.77
A180	FIRST CHANNEL IN CHL TANK	47.91	47.91
A150	1ST PASS IN CHL TANK	47.65	47.65
A80	FINAL CHANNEL IN CHL TANK	47.35	47.37
A40	JUNCTION BOX BEFORE CREEK	45.68	45.69

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\EASTSI~4.SUM
 BBBBBB CC Data file: C:\PROFIL~2\EA5C5~1.PRO
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC EAST SIDE 1971
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By: MARK RICHARDS

PLANT FLOW = 77.36 CFS OR 50.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A740	FIRST CHANNEL IN GRIT CHAM	63.37	63.38
A650	CHANNEL IN AERATED GRIT TANK	63.10	63.10
A610	FINAL CHAN IN AERATED GRIT CHA	63.04	63.05
A580	FIRST CHANNEL IN DIST BOX #1	57.49	57.49
A565	CHANNEL AFTER WEIR IN DIST BOX	56.10	56.11
A510	WEIR PLATE IN PRIMARY CLR	54.48	54.48
	WEIR SUBMERGED, W.S. DS	54.48	
	V-NOTCH INVERT	53.83	
A500	EFFLUENT LAUNDER IN PRIMARY CL	54.48	54.48
A490	DROP BOX AFTER PRIM CLR	54.37	54.38
A450	ZONE#1 IN AEARATION BASIN	53.66	53.68
A380	ZONE 3 IN AEARION BASIN	53.65	53.65
A320	MIXED LIQUOR CH IN AERATION BA	53.64	53.64
A270	WEIR PLATE IN FINAL CHL	50.91	50.91
	WEIR SUBMERGED, W.S. DS	50.91	
	V-NOTCH INVERT	47.83	
A260	COLLECTION LAUNDER IN FINAL CH	50.91	50.91

A255	DROP BOX AFTER FINAL CLR	50.80	50.81
A210	DIST BOX #2	50.43	50.43
A180	FIRST CHANNEL IN CHL TANK	49.09	49.10
A150	1ST PASS IN CHL TANK	48.68	48.68
A80	FINAL CHANNEL IN CHL TANK	48.51	48.53
A40	JUNCTION BOX BEFORE CREEK	45.90	45.92

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\EASTSIDE.det
 BBBBBB CC Data file: C:\PROFIL~2\EASTSIDE.pro
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC EAST SIDE 1971
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By: MARK RICHARDS

PLANT FLOW = 34.81 CFS OR 22.50 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

F10

FULL FLOW THROUGH PLANT

FLOW PERCENT

FLOW = 34.81 CFS OR 22.50 MGD
 100.00 PERCENT OF TOTAL PLANT FLOW.

A10

OUTFALL AT SALT CREEK

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 1.000
 PIPE DIAMETER = 48.00 INCHES
 INVERT ELEVATION = 24.500

VELOCITY = 2.77 FT/SEC
 ENERGY LOSS, FEET = .119
 ENERGY GRADE = 44.889
 HYDRAULIC GRADE = 44.770

A20

48" PIPE FROM JB TO OUTFALL

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 48.0000 INCHES
 ROUGHNESS = .0025 FEET
 LENGTH = 100.0000 FEET

VELOCITY, FPS = 2.77
 REYNOLDS NUMBER = 910530.
 DARCY-WEISBACH FRICTION FACTOR = .0184
 EQUIVALENT HAZEN WILLIAMS C = 122.
 EQUIVALENT MANNING COEFFICIENT = .0126
 ENERGY LOSS, FEET = .055
 ENERGY GRADE = 44.944
 HYDRAULIC GRADE = 44.825

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A30

EXIT FROM JB

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .500
PIPE DIAMETER = 48.00 INCHES
INVERT ELEVATION = 30.000

VELOCITY = 2.77 FT/SEC
ENERGY LOSS, FEET = .060
ENERGY GRADE = 45.004
HYDRAULIC GRADE = 44.884

A40

JUNCTION BOX BEFORE CREEK

RECTANGULAR CONDUIT

HEIGHT = 16.00 FEET
WIDTH = 4.00 FEET
LENGTH = 6.00 FEET
MANNING ROUGHNESS = .0130
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 30.000

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	14.998	.580	.00001			44.998	45.004
.300	14.998	.580	.00001	.00001	.000	44.998	45.004
.600	14.998	.580	.00001	.00001	.000	44.998	45.004
.900	14.998	.580	.00001	.00001	.000	44.998	45.004
1.200	14.998	.580	.00001	.00001	.000	44.998	45.004
1.500	14.998	.580	.00001	.00001	.000	44.998	45.004
1.800	14.998	.580	.00001	.00001	.000	44.998	45.004
2.100	14.998	.580	.00001	.00001	.000	44.998	45.004
2.400	14.998	.580	.00001	.00001	.000	44.998	45.004
2.700	14.998	.580	.00001	.00001	.000	44.998	45.004
3.000	14.998	.580	.00001	.00001	.000	44.998	45.004
3.300	14.998	.580	.00001	.00001	.000	44.998	45.004
3.600	14.998	.580	.00001	.00001	.000	44.998	45.004
3.900	14.998	.580	.00001	.00001	.000	44.998	45.004
4.200	14.998	.580	.00001	.00001	.000	44.998	45.004
4.500	14.998	.580	.00001	.00001	.000	44.998	45.004
4.800	14.998	.580	.00001	.00001	.000	44.998	45.004
5.100	14.998	.580	.00001	.00001	.000	44.998	45.004
5.400	14.998	.580	.00001	.00001	.000	44.998	45.004
5.700	14.998	.580	.00001	.00001	.000	44.998	45.004
6.000	14.998	.580	.00001	.00001	.000	44.998	45.004

CRITICAL SLOPE, FT/FT = .0044
CRITICAL DEPTH, FEET = 1.33
CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 45.004
HYDRAULIC GRADE = 44.998

F15

FULL FLOW FROM BOTH TRAINS

FLOW PERCENT

FLOW = 34.81 CFS OR 22.50 MGD
100.00 PERCENT OF TOTAL PLANT FLOW.

BROWN AND CALDWELL PROFILE SERIAL NO. 9901
Consulting Engineers Version 2.00

A50

ENTRANCE INTO JB

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 2.200
PIPE DIAMETER = 48.00 INCHES
INVERT ELEVATION = 37.000

VELOCITY = 2.77 FT/SEC
ENERGY LOSS, FEET = .262
ENERGY GRADE = 45.266
HYDRAULIC GRADE = 45.147

A60

48" PIPE FROM CHL TANK TO JB

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 48.0000 INCHES
ROUGHNESS = .0055 FEET
LENGTH = 15.0000 FEET

VELOCITY, FPS = 2.77
REYNOLDS NUMBER = 910530.
DARCY-WEISBACH FRICTION FACTOR = .0219
EQUIVALENT HAZEN WILLIAMS C = 111.
EQUIVALENT MANNING COEFFICIENT = .0137
ENERGY LOSS, FEET = .010
ENERGY GRADE = 45.276
HYDRAULIC GRADE = 45.156

A63

90 TURN IN PIPE

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .550
PIPE DIAMETER = 48.00 INCHES
INVERT ELEVATION = 37.000

VELOCITY = 2.77 FT/SEC
ENERGY LOSS, FEET = .066
ENERGY GRADE = 45.341
HYDRAULIC GRADE = 45.222

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A67

48" PIPE BETWEEN CHL AND JB

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 48.0000 INCHES
ROUGHNESS = .0055 FEET
LENGTH = 20.0000 FEET

VELOCITY, FPS = 2.77
REYNOLDS NUMBER = 910530.
DARCY-WEISBACH FRICTION FACTOR = .0219
EQUIVALENT HAZEN WILLIAMS C = 111.
EQUIVALENT MANNING COEFFICIENT = .0137
ENERGY LOSS, FEET = .013
ENERGY GRADE = 45.354
HYDRAULIC GRADE = 45.235

A70

48" EXIT FROM CHL TANK

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 1.500
PIPE DIAMETER = 48.00 INCHES
INVERT ELEVATION = 37.000

VELOCITY = 2.77 FT/SEC
ENERGY LOSS, FEET = .179
ENERGY GRADE = 45.533
HYDRAULIC GRADE = 45.414

A80

FINAL CHANNEL IN CHL TANK

RECTANGULAR CONDUIT

HEIGHT = 9.60 FEET
WIDTH = 7.00 FEET
LENGTH = 25.00 FEET
MANNING ROUGHNESS = .0130
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 37.000

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	8.528	.583	.00001			45.528	45.533
1.250	8.528	.583	.00001	.00001	.000	45.528	45.533
2.500	8.528	.583	.00001	.00001	.000	45.528	45.533
3.750	8.528	.583	.00001	.00001	.000	45.528	45.533
5.000	8.528	.583	.00001	.00001	.000	45.528	45.533
6.250	8.528	.583	.00001	.00001	.000	45.528	45.533

7.500	8.528	.583	.00001	.00001	.000	45.528	45.533
8.750	8.528	.583	.00001	.00001	.000	45.528	45.533
10.000	8.528	.583	.00001	.00001	.000	45.528	45.533
11.250	8.528	.583	.00001	.00001	.000	45.528	45.533
12.500	8.528	.583	.00001	.00001	.000	45.528	45.533
13.750	8.528	.583	.00001	.00001	.000	45.528	45.533
15.000	8.528	.583	.00001	.00001	.000	45.528	45.533
16.250	8.528	.583	.00001	.00001	.000	45.528	45.533
17.500	8.528	.583	.00001	.00001	.000	45.528	45.533
18.750	8.528	.583	.00001	.00001	.000	45.528	45.533
20.000	8.528	.583	.00001	.00001	.000	45.528	45.533
21.250	8.528	.583	.00001	.00001	.000	45.528	45.533
22.500	8.528	.583	.00001	.00001	.000	45.528	45.533
23.750	8.528	.583	.00001	.00001	.000	45.528	45.533
25.000	8.528	.583	.00001	.00001	.000	45.528	45.533

CRITICAL SLOPE, FT/FT = .0035
 CRITICAL DEPTH, FEET = .92
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:
 ENERGY GRADE = 45.533
 HYDRAULIC GRADE = 45.528

BROWN AND CALDWELL PROFILE SERIAL NO. 9901
 Consulting Engineers Version 2.00

F20
 1/2 TOTAL FLOW THROUGH CHL TANK
 FLOW PERCENT
 FLOW = 17.41 CFS OR 11.25 MGD
 50.00 PERCENT OF TOTAL PLANT FLOW.

A85
 SHARP CRESETED WEIR IN CHR TANK
 SHARP-CRESTED WEIR
 WEIR CREST ELEVATION = 45.330
 WEIR DISCHARGE = 17.41 CFS
 LENGTH = 5.00 FEET

NO END CONTRACTIONS

***** WEIR SUBMERGED *****
 CALCULATED C VALUE = 3.339
 HEIGHT OF WATER OVER WEIR = 1.050
 ENERGY LOSS, FEET = .847
 ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.380

A90
 4TH PASS IN CHL TANK
 RECTANGULAR CONDUIT
 HEIGHT = 10.60 FEET
 WIDTH = 10.00 FEET
 LENGTH = 50.00 FEET

MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 36.000

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	10.379	.168	.00000			46.379	46.380
2.500	10.379	.168	.00000	.00000	.000	46.379	46.380
5.000	10.379	.168	.00000	.00000	.000	46.379	46.380
7.500	10.379	.168	.00000	.00000	.000	46.379	46.380
10.000	10.379	.168	.00000	.00000	.000	46.379	46.380
12.500	10.379	.168	.00000	.00000	.000	46.379	46.380
15.000	10.379	.168	.00000	.00000	.000	46.379	46.380
17.500	10.379	.168	.00000	.00000	.000	46.379	46.380
20.000	10.379	.168	.00000	.00000	.000	46.379	46.380
22.500	10.379	.168	.00000	.00000	.000	46.379	46.380
25.000	10.379	.168	.00000	.00000	.000	46.379	46.380
27.500	10.379	.168	.00000	.00000	.000	46.379	46.380
30.000	10.379	.168	.00000	.00000	.000	46.379	46.380
32.500	10.379	.168	.00000	.00000	.000	46.379	46.380
35.000	10.379	.168	.00000	.00000	.000	46.379	46.380
37.500	10.379	.168	.00000	.00000	.000	46.379	46.380
40.000	10.379	.168	.00000	.00000	.000	46.379	46.380
42.500	10.379	.168	.00000	.00000	.000	46.379	46.380
45.000	10.379	.168	.00000	.00000	.000	46.379	46.380
47.500	10.379	.168	.00000	.00000	.000	46.379	46.380
50.000	10.379	.168	.00000	.00000	.000	46.379	46.380

CRITICAL SLOPE, FT/FT = .0036
 CRITICAL DEPTH, FEET = .46
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.379

BROWN AND CALDWELL
 Consulting Engineers

PROFILE
 Version 2.00

SERIAL NO. 9901

A100

180 TURN IN CHL TANK

"K" LOSS IN RECTANGULAR OPEN CHANNEL

WIDTH = 10.00 FEET

INVERT ELEV. = 36.000 FEET

SIDEWALL = 10.60 FEET

LOSS COEFFICIENT "K" = .60

VELOCITY = .17 FT/SEC

ENERGY LOSS, FEET = .000
 ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.380

A110

3RD PASS IN CHL TANK

RECTANGULAR CONDUIT

HEIGHT = 10.60 FEET
 WIDTH = 29.50 FEET
 LENGTH = 50.00 FEET
 MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 36.000

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	10.380	.057	.00000			46.380	46.380
2.500	10.380	.057	.00000	.00000	.000	46.380	46.380
5.000	10.380	.057	.00000	.00000	.000	46.380	46.380
7.500	10.380	.057	.00000	.00000	.000	46.380	46.380
10.000	10.380	.057	.00000	.00000	.000	46.380	46.380
12.500	10.380	.057	.00000	.00000	.000	46.380	46.380
15.000	10.380	.057	.00000	.00000	.000	46.380	46.380
17.500	10.380	.057	.00000	.00000	.000	46.380	46.380
20.000	10.380	.057	.00000	.00000	.000	46.380	46.380
22.500	10.380	.057	.00000	.00000	.000	46.380	46.380
25.000	10.380	.057	.00000	.00000	.000	46.380	46.380
27.500	10.380	.057	.00000	.00000	.000	46.380	46.380
30.000	10.380	.057	.00000	.00000	.000	46.380	46.380
32.500	10.380	.057	.00000	.00000	.000	46.380	46.380
35.000	10.380	.057	.00000	.00000	.000	46.380	46.380
37.500	10.380	.057	.00000	.00000	.000	46.380	46.380
40.000	10.380	.057	.00000	.00000	.000	46.380	46.380
42.500	10.380	.057	.00000	.00000	.000	46.380	46.380
45.000	10.380	.057	.00000	.00000	.000	46.380	46.380
47.500	10.380	.057	.00000	.00000	.000	46.380	46.380
50.000	10.380	.057	.00000	.00000	.000	46.380	46.380

CRITICAL SLOPE, FT/FT = .0041
 CRITICAL DEPTH, FEET = .22
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.380

A120

180 TURN IN CHL TANK

"K" LOSS IN RECTANGULAR CONDUIT
 WIDTH = 29.50 FEET
 INVERT ELEV. = 36.000 FEET
 SIDEWALL = 10.60 FEET
 LOSS COEFFICIENT "K" = .60

VELOCITY = .06 FT/SEC
 ENERGY LOSS, FEET = .000
 ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.380

BROWN AND CALDWELL
 Consulting Engineers

PROFILE
 Version 2.00

SERIAL NO. 9901

A130

2ND PASS IN CHL TANK

RECTANGULAR CONDUIT

HEIGHT = 10.60 FEET
 WIDTH = 29.50 FEET
 LENGTH = 50.00 FEET
 MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 36.000

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	10.380	.057	.00000			46.380	46.380
2.500	10.380	.057	.00000	.00000	.000	46.380	46.380
5.000	10.380	.057	.00000	.00000	.000	46.380	46.380
7.500	10.380	.057	.00000	.00000	.000	46.380	46.380
10.000	10.380	.057	.00000	.00000	.000	46.380	46.380
12.500	10.380	.057	.00000	.00000	.000	46.380	46.380
15.000	10.380	.057	.00000	.00000	.000	46.380	46.380
17.500	10.380	.057	.00000	.00000	.000	46.380	46.380
20.000	10.380	.057	.00000	.00000	.000	46.380	46.380
22.500	10.380	.057	.00000	.00000	.000	46.380	46.380
25.000	10.380	.057	.00000	.00000	.000	46.380	46.380
27.500	10.380	.057	.00000	.00000	.000	46.380	46.380
30.000	10.380	.057	.00000	.00000	.000	46.380	46.380
32.500	10.380	.057	.00000	.00000	.000	46.380	46.380
35.000	10.380	.057	.00000	.00000	.000	46.380	46.380
37.500	10.380	.057	.00000	.00000	.000	46.380	46.380
40.000	10.380	.057	.00000	.00000	.000	46.380	46.380
42.500	10.380	.057	.00000	.00000	.000	46.380	46.380
45.000	10.380	.057	.00000	.00000	.000	46.380	46.380
47.500	10.380	.057	.00000	.00000	.000	46.380	46.380
50.000	10.380	.057	.00000	.00000	.000	46.380	46.380

CRITICAL SLOPE, FT/FT = .0041

CRITICAL DEPTH, FEET = .22
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.380

A140

180 TURN IN CHL TANK

"K" LOSS IN RECTANGULAR OPEN CHANNEL

WIDTH = 29.50 FEET
 INVERT ELEV. = 36.000 FEET
 SIDEWALL = 10.60 FEET
 LOSS COEFFICIENT "K" = .60

VELOCITY = .06 FT/SEC
 ENERGY LOSS, FEET = .000
 ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.380

A150

1ST PASS IN CHL TANK

RECTANGULAR CONDUIT

HEIGHT = 10.60 FEET
 WIDTH = 29.50 FEET
 LENGTH = 50.00 FEET
 MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 36.000

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	10.380	.057	.00000			46.380	46.380
2.500	10.380	.057	.00000	.00000	.000	46.380	46.380
5.000	10.380	.057	.00000	.00000	.000	46.380	46.380
7.500	10.380	.057	.00000	.00000	.000	46.380	46.380
10.000	10.380	.057	.00000	.00000	.000	46.380	46.380
12.500	10.380	.057	.00000	.00000	.000	46.380	46.380
15.000	10.380	.057	.00000	.00000	.000	46.380	46.380
17.500	10.380	.057	.00000	.00000	.000	46.380	46.380
20.000	10.380	.057	.00000	.00000	.000	46.380	46.380
22.500	10.380	.057	.00000	.00000	.000	46.380	46.380
25.000	10.380	.057	.00000	.00000	.000	46.380	46.380
27.500	10.380	.057	.00000	.00000	.000	46.380	46.380
30.000	10.380	.057	.00000	.00000	.000	46.380	46.380
32.500	10.380	.057	.00000	.00000	.000	46.380	46.380
35.000	10.380	.057	.00000	.00000	.000	46.380	46.380
37.500	10.380	.057	.00000	.00000	.000	46.380	46.380
40.000	10.380	.057	.00000	.00000	.000	46.380	46.380

42.500	10.380	.057	.00000	.00000	.000	46.380	46.380
45.000	10.380	.057	.00000	.00000	.000	46.380	46.380
47.500	10.380	.057	.00000	.00000	.000	46.380	46.380
50.000	10.380	.057	.00000	.00000	.000	46.380	46.380

CRITICAL SLOPE, FT/FT = .0041
 CRITICAL DEPTH, FEET = .22
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.380

BROWN AND CALDWELL PROFILE SERIAL NO. 9901
 Consulting Engineers Version 2.00

A155

90 TURN IN CHL

"K" LOSS IN RECTANGULAR CONDUIT
 WIDTH = 29.50 FEET
 INVERT ELEV. = 36.000 FEET
 SIDEWALL = 10.60 FEET
 LOSS COEFFICIENT "K" = 2.00

VELOCITY = .06 FT/SEC
 ENERGY LOSS, FEET = .000
 ENERGY GRADE = 46.380
 HYDRAULIC GRADE = 46.380

A170

SUB ORIFICE IN CHL TANK (?)

SUBMERGED RECTANGULAR ORIFICE
 NO OF ORIFICES = 1
 ORIFICE HEIGHT = 4.00 FEET
 ORIFICE WIDTH = 4.00 FEET
 DISCHARGE COEFFICIENT = .470

FLOW PER ORIFICE = 17.41 CFS
 VELOCITY THROUGH ORIFICE, FPS = 1.09
 ENERGY LOSS, FEET = .083
 ENERGY GRADE = 46.464
 HYDRAULIC GRADE = 46.464

F30

FULL FLOW IN CHL TANK

FLOW PERCENT

FLOW = 34.81 CFS OR 22.50 MGD
 100.00 PERCENT OF TOTAL PLANT FLOW.

BROWN AND CALDWELL PROFILE SERIAL NO. 9901
 Consulting Engineers Version 2.00

A180

FIRST CHANNEL IN CHL TANK
 RECTANGULAR CONDUIT

HEIGHT = 15.50 FEET
 WIDTH = 8.00 FEET
 LENGTH= 16.00 FEET
 MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 31.000

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	15.462	.281	.00000			46.462	46.464
.800	15.462	.281	.00000	.00000	.000	46.462	46.464
1.600	15.462	.281	.00000	.00000	.000	46.462	46.464
2.400	15.462	.281	.00000	.00000	.000	46.462	46.464
3.200	15.462	.281	.00000	.00000	.000	46.462	46.464
4.000	15.462	.281	.00000	.00000	.000	46.462	46.464
4.800	15.462	.281	.00000	.00000	.000	46.462	46.464
5.600	15.462	.281	.00000	.00000	.000	46.462	46.464
6.400	15.462	.281	.00000	.00000	.000	46.462	46.464
7.200	15.462	.281	.00000	.00000	.000	46.462	46.464
8.000	15.462	.281	.00000	.00000	.000	46.462	46.464
8.800	15.462	.281	.00000	.00000	.000	46.462	46.464
9.600	15.462	.281	.00000	.00000	.000	46.462	46.464
10.400	15.462	.281	.00000	.00000	.000	46.462	46.464
11.200	15.462	.281	.00000	.00000	.000	46.462	46.464
12.000	15.462	.281	.00000	.00000	.000	46.462	46.464
12.800	15.462	.281	.00000	.00000	.000	46.462	46.464
13.600	15.462	.281	.00000	.00000	.000	46.462	46.464
14.400	15.462	.281	.00000	.00000	.000	46.462	46.464
15.200	15.462	.281	.00000	.00000	.000	46.462	46.464
16.000	15.462	.281	.00000	.00000	.000	46.462	46.464

CRITICAL SLOPE, FT/FT = .0034
 CRITICAL DEPTH, FEET = .84
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 46.464
 HYDRAULIC GRADE = 46.462

A185

60" ENTRANCE INTO CHL TANK

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 3.000
 PIPE DIAMETER = 60.00 INCHES
 INVERT ELEVATION = 31.000

VELOCITY = 1.77 FT/SEC
 ENERGY LOSS, FEET = .146

ENERGY GRADE = 46.610
HYDRAULIC GRADE = 46.561

A190

60" PIPE BETWEEN DIST BOX AND CHL TANK
DARCY-WEISBACH FRICTION

PIPE DIAMETER = 60.0000 INCHES
ROUGHNESS = .0060 FEET
LENGTH = 55.0000 FEET

VELOCITY, FPS = 1.77
REYNOLDS NUMBER = 728424.
DARCY-WEISBACH FRICTION FACTOR = .0213
EQUIVALENT HAZEN WILLIAMS C = 114.
EQUIVALENT MANNING COEFFICIENT = .0140
ENERGY LOSS, FEET = .011
ENERGY GRADE = 46.621
HYDRAULIC GRADE = 46.573

BROWN AND CALDWELL PROFILE SERIAL NO. 9901
Consulting Engineers Version 2.00

A200

60" PIPE EXIT FROM DIST BOX
"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 2.300
PIPE DIAMETER = 60.00 INCHES
INVERT ELEVATION = 31.000

VELOCITY = 1.77 FT/SEC
ENERGY LOSS, FEET = .112
ENERGY GRADE = 46.734
HYDRAULIC GRADE = 46.685

F30

FULL FLOW WITH 1965 TRAIN
FLOW PERCENT

FLOW = 34.81 CFS OR 22.50 MGD
100.00 PERCENT OF TOTAL PLANT FLOW.

A210

DIST BOX #2
RECTANGULAR CONDUIT

HEIGHT = 27.00 FEET
WIDTH = 8.00 FEET
LENGTH = 8.00 FEET
MANNING ROUGHNESS = .0200
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 31.000

SUBCRITICAL FLOW

STATION	WATER DEPTH	VELOCITY	FRICTION FACTOR	AVERAGE FRICTION FACTOR	FRICTION LOSS	HYDRAULIC	ENERGY
---------	----------------	----------	--------------------	-------------------------------	------------------	-----------	--------

FEET	FEET	FT/SEC	FT/FOOT	FT/FOOT	FEET	GRADE	GRADE
.000	15.733	.277	.00000			46.733	46.734
.400	15.733	.277	.00000	.00000	.000	46.733	46.734
.800	15.733	.277	.00000	.00000	.000	46.733	46.734
1.200	15.733	.277	.00000	.00000	.000	46.733	46.734
1.600	15.733	.277	.00000	.00000	.000	46.733	46.734
2.000	15.733	.277	.00000	.00000	.000	46.733	46.734
2.400	15.733	.277	.00000	.00000	.000	46.733	46.734
2.800	15.733	.277	.00000	.00000	.000	46.733	46.734
3.200	15.733	.277	.00000	.00000	.000	46.733	46.734
3.600	15.733	.277	.00000	.00000	.000	46.733	46.734
4.000	15.733	.277	.00000	.00000	.000	46.733	46.734
4.400	15.733	.277	.00000	.00000	.000	46.733	46.734
4.800	15.733	.277	.00000	.00000	.000	46.733	46.734
5.200	15.733	.277	.00000	.00000	.000	46.733	46.734
5.600	15.733	.277	.00000	.00000	.000	46.733	46.734
6.000	15.733	.277	.00000	.00000	.000	46.733	46.734
6.400	15.733	.277	.00000	.00000	.000	46.733	46.734
6.800	15.733	.277	.00000	.00000	.000	46.733	46.734
7.200	15.733	.277	.00000	.00000	.000	46.733	46.734
7.600	15.733	.277	.00000	.00000	.000	46.733	46.734
8.000	15.733	.277	.00000	.00000	.000	46.733	46.734

CRITICAL SLOPE, FT/FT = .0080

CRITICAL DEPTH, FEET = .84

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000

ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 46.734

HYDRAULIC GRADE = 46.733

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

F40

1/2 FLOW THROUGH PRC TRAIN 1971

FLOW PERCENT

FLOW = 11.49 CFS OR 7.43 MGD
33.00 PERCENT OF TOTAL PLANT FLOW.

A230

30" ENTRANCE INTO DISTR BOX #2

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .500

PIPE DIAMETER = 30.00 INCHES

INVERT ELEVATION = 41.790

VELOCITY = 2.34 FT/SEC

ENERGY LOSS, FEET = .043

ENERGY GRADE = 46.776

HYDRAULIC GRADE = 46.691

A240

30" PIPE FROM FINAL BASIN TO DISTR BOX#2

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 30.0000 INCHES
 ROUGHNESS = .0020 FEET
 LENGTH = 25.0000 FEET

VELOCITY, FPS = 2.34
 REYNOLDS NUMBER = 480760.
 DARCY-WEISBACH FRICTION FACTOR = .0197
 EQUIVALENT HAZEN WILLIAMS C = 124.
 EQUIVALENT MANNING COEFFICIENT = .0120
 ENERGY LOSS, FEET = .017
 ENERGY GRADE = 46.793
 HYDRAULIC GRADE = 46.708

BROWN AND CALDWELL
 Consulting Engineers

PROFILE
 Version 2.00

SERIAL NO. 9901

A250

30" PIPE ENTRANCE AFTER FINAL CLR

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .200
 PIPE DIAMETER = 30.00 INCHES
 INVERT ELEVATION = 41.790

VELOCITY = 2.34 FT/SEC
 ENERGY LOSS, FEET = .017
 ENERGY GRADE = 46.810
 HYDRAULIC GRADE = 46.725

A255

DROP BOX AFTER FINAL CLR

RECTANGULAR CONDUIT

HEIGHT = 7.47 FEET
 WIDTH = 7.00 FEET
 LENGTH = 3.00 FEET
 MANNING ROUGHNESS = .0100
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 42.030

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	4.778	.343	.00000			46.808	46.810
.150	4.778	.343	.00000	.00000	.000	46.808	46.810
.300	4.778	.343	.00000	.00000	.000	46.808	46.810
.450	4.778	.343	.00000	.00000	.000	46.808	46.810
.600	4.778	.343	.00000	.00000	.000	46.808	46.810
.750	4.778	.343	.00000	.00000	.000	46.808	46.810
.900	4.778	.343	.00000	.00000	.000	46.808	46.810
1.050	4.778	.343	.00000	.00000	.000	46.808	46.810
1.200	4.778	.343	.00000	.00000	.000	46.808	46.810

1.350	4.778	.343	.00000	.00000	.000	46.808	46.810
1.500	4.778	.343	.00000	.00000	.000	46.808	46.810
1.650	4.778	.343	.00000	.00000	.000	46.808	46.810
1.800	4.778	.343	.00000	.00000	.000	46.808	46.810
1.950	4.778	.343	.00000	.00000	.000	46.808	46.810
2.100	4.778	.343	.00000	.00000	.000	46.808	46.810
2.250	4.778	.343	.00000	.00000	.000	46.808	46.810
2.400	4.778	.343	.00000	.00000	.000	46.808	46.810
2.550	4.778	.343	.00000	.00000	.000	46.808	46.810
2.700	4.778	.343	.00000	.00000	.000	46.808	46.810
2.850	4.778	.343	.00000	.00000	.000	46.808	46.810
3.000	4.778	.343	.00000	.00000	.000	46.808	46.810

CRITICAL SLOPE, FT/FT = .0022

CRITICAL DEPTH, FEET = .44

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000

ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 46.810

HYDRAULIC GRADE = 46.808

A260

COLLECTION LAUNDER IN FINAL CHL

RECTANGULAR LAUNDER

UPSTREAM WIDTH = 2.50 FEET

DOWNSTREAM WIDTH = 2.50 FEET

LAUNDER SIDEWALL HEIGHT = 2.00 FEET

LENGTH = 194.80 FEET

MANNINGS ROUGHNESS = .0100 FEET

SLOPE = .00000 FEET/FOOT

INVERT ELEV AT OUTLET = 45.800

DISCHARGE AT OUTLET = 3.71 MGD

STATION	DELTA DEPTH ASSUMED	WATER DEPTH	FLOW CFS	VELOCITY FT/SEC	MOMENTUM DELTA DEPTH	FRICTION LOSS	DELTA DEPTH CALC	HYDRAULIC GRADE	ENERGY GRADE
.00		.914	5.74	2.51				46.714	46.810
6.49	.013	.927	5.55	2.40	.015	.004	.019	46.727	46.816
12.99	.012	.939	5.36	2.28	.014	.004	.018	46.739	46.820
19.48	.011	.950	5.17	2.18	.013	.003	.016	46.750	46.824
25.97	.011	.961	4.98	2.07	.012	.003	.015	46.761	46.828
32.47	.010	.971	4.79	1.97	.011	.003	.014	46.771	46.831
38.96	.009	.981	4.60	1.87	.010	.002	.013	46.781	46.835
45.45	.009	.989	4.40	1.78	.010	.002	.012	46.789	46.839
51.95	.008	.998	4.21	1.69	.009	.002	.011	46.798	46.842
58.44	.008	1.006	4.02	1.60	.008	.002	.010	46.806	46.845
64.93	.007	1.013	3.83	1.51	.008	.002	.009	46.813	46.849
71.43	.007	1.020	3.64	1.43	.007	.001	.009	46.820	46.852
77.92	.006	1.026	3.45	1.34	.007	.001	.008	46.826	46.854
84.41	.006	1.033	3.25	1.26	.006	.001	.007	46.833	46.857
90.91	.006	1.038	3.06	1.18	.006	.001	.007	46.838	46.860
97.40	.005	1.043	2.87	1.10	.005	.001	.006	46.843	46.862
103.89	.005	1.048	2.68	1.02	.005	.001	.006	46.848	46.864

110.39	.004	1.053	2.49	.95	.005	.001	.005	46.853	46.867
116.88	.004	1.057	2.30	.87	.004	.001	.005	46.857	46.869
123.37	.004	1.061	2.11	.79	.004	.000	.004	46.861	46.870
129.87	.003	1.064	1.91	.72	.003	.000	.004	46.864	46.872
136.36	.003	1.067	1.72	.65	.003	.000	.003	46.867	46.874
142.85	.003	1.070	1.53	.57	.003	.000	.003	46.870	46.875
149.35	.002	1.072	1.34	.50	.002	.000	.003	46.872	46.876
155.84	.002	1.074	1.15	.43	.002	.000	.002	46.874	46.877
162.33	.002	1.076	.96	.36	.002	.000	.002	46.876	46.878
168.83	.001	1.077	.77	.28	.001	.000	.001	46.877	46.879
175.32	.001	1.078	.57	.21	.001	.000	.001	46.878	46.879
181.81	.001	1.079	.38	.14	.001	.000	.001	46.879	46.880
188.31	.000	1.080	.19	.07	.000	.000	.000	46.880	46.880
194.80	.000	1.080	.00	.00				46.880	46.880

CRITICAL DEPTH, FEET = .55

WATER DEPTH AT UPSTREAM END OF LAUNDER = 1.08

CHANGE IN HYDRAULIC GRADE WITHIN LAUNDER = .166

ENERGY LOSS, FEET = .070

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A270

WEIR PLATE IN FINAL CHL

V-NOTCH WEIR PLATE

WEIR: DISCHARGE = 11.49 CFS

LENGTH = 389.56 FEET

TOP OF PLATE ELEV = 48.000

V-NOTCH: SPACING = 6.00 INCHES

ANGLE = 90.00 DEGREES

DEPTH = 2.00 INCHES

INVERT = 47.833

WS ELEV DOWNSTREAM OF WEIR = 46.880

FREEBOARD = .953

ENERGY LOSS, FEET = 1.082

ENERGY GRADE = 47.962

HYDRAULIC GRADE = 47.962

F67

1/2 FLOW WITH 1/2 RAS

FLOW PERCENT

FLOW = 17.41 CFS OR 11.25 MGD

50.00 PERCENT OF TOTAL PLANT FLOW.

A280

30" PIPE OPENING

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 1.000

PIPE DIAMETER = 30.00 INCHES

INVERT ELEVATION = 28.920

VELOCITY = 3.55 FT/SEC

ENERGY LOSS, FEET = .195

ENERGY GRADE = 48.157

HYDRAULIC GRADE = 47.962

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A300

90 DEGREE ELBOW UNDER FINAL CHL

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .600
PIPE DIAMETER = 30.00 INCHES
INVERT ELEVATION = 28.920

VELOCITY = 3.55 FT/SEC
ENERGY LOSS, FEET = .117
ENERGY GRADE = 48.274
HYDRAULIC GRADE = 48.079

A302

30" PIPE FROM AERATION BASIN TO FINAL CLR

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 30.0000 INCHES
ROUGHNESS = .0042 FEET
LENGTH = 80.0000 FEET

VELOCITY, FPS = 3.55
REYNOLDS NUMBER = 728424.
DARCY-WEISBACH FRICTION FACTOR = .0231
EQUIVALENT HAZEN WILLIAMS C = 110.
EQUIVALENT MANNING COEFFICIENT = .0130
ENERGY LOSS, FEET = .144
ENERGY GRADE = 48.418
HYDRAULIC GRADE = 48.223

A310

30" ENTRANCE AFTER AERATION BASIN

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .500
PIPE DIAMETER = 30.00 INCHES
INVERT ELEVATION = 31.510

VELOCITY = 3.55 FT/SEC
ENERGY LOSS, FEET = .098
ENERGY GRADE = 48.516
HYDRAULIC GRADE = 48.321

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A320

MIXED LIQUOR CH IN AERATION BASIN

RECTANGULAR CONDUIT

HEIGHT = 24.50 FEET
WIDTH = 3.00 FEET
LENGTH = 56.00 FEET
MANNING ROUGHNESS = .0130
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 31.500

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	17.014	.341	.00001			48.514	48.516
2.800	17.014	.341	.00001	.00001	.000	48.514	48.516
5.600	17.014	.341	.00001	.00001	.000	48.514	48.516
8.400	17.014	.341	.00001	.00001	.000	48.514	48.516
11.200	17.014	.341	.00001	.00001	.000	48.514	48.516
14.000	17.014	.341	.00001	.00001	.000	48.514	48.516
16.800	17.014	.341	.00001	.00001	.000	48.514	48.516
19.600	17.014	.341	.00001	.00001	.000	48.514	48.516
22.400	17.014	.341	.00001	.00001	.000	48.514	48.516
25.200	17.014	.341	.00001	.00001	.000	48.514	48.516
28.000	17.014	.341	.00001	.00001	.000	48.514	48.516
30.800	17.014	.341	.00001	.00001	.000	48.514	48.516
33.600	17.014	.341	.00001	.00001	.000	48.514	48.516
36.400	17.015	.341	.00001	.00001	.000	48.515	48.516
39.200	17.015	.341	.00001	.00001	.000	48.515	48.516
42.000	17.015	.341	.00001	.00001	.000	48.515	48.516
44.800	17.015	.341	.00001	.00001	.000	48.515	48.516
47.600	17.015	.341	.00001	.00001	.000	48.515	48.516
50.400	17.015	.341	.00001	.00001	.000	48.515	48.516
53.200	17.015	.341	.00001	.00001	.000	48.515	48.516
56.000	17.015	.341	.00001	.00001	.000	48.515	48.516

CRITICAL SLOPE, FT/FT = .0049

CRITICAL DEPTH, FEET = 1.01

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000

ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 48.516

HYDRAULIC GRADE = 48.515

A330

180 TURN IN AERATION

"K" LOSS IN RECTANGULAR CONDUIT

WIDTH = 44.00 FEET

INVERT ELEV. = 47.790 FEET

SIDEWALL = 24.50 FEET

LOSS COEFFICIENT "K" = .60

VELOCITY = .55 FT/SEC

ENERGY LOSS, FEET = .003

ENERGY GRADE = 48.519

HYDRAULIC GRADE = 48.515

A340

WEIR #4 IN AERATION

SHARP-CRESTED WEIR

WEIR CREST ELEVATION = 50.000

WEIR DISCHARGE = 17.41 CFS
 LENGTH = 20.00 FEET

NO END CONTRACTIONS
 FREEBOARD = 1.485
 CALCULATED C VALUE = 3.330
 HEIGHT OF WATER OVER WEIR = .409
 ENERGY LOSS, FEET = 1.889
 ENERGY GRADE = 50.409
 HYDRAULIC GRADE = 50.409

BROWN AND CALDWELL
 Consulting Engineers

PROFILE
 Version 2.00

SERIAL NO. 9901

A350

ZONE #4 IN AEARION BASIN

RECTANGULAR CONDUIT

HEIGHT = 24.50 FEET
 WIDTH = 44.00 FEET
 LENGTH = 92.00 FEET
 MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 31.500

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICITION FACTOR FT/FOOT	AVERAGE FRICITION FACTOR FT/FOOT	FRICITION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	18.909	.021	.00000			50.409	50.409
4.600	18.909	.021	.00000	.00000	.000	50.409	50.409
9.200	18.909	.021	.00000	.00000	.000	50.409	50.409
13.800	18.909	.021	.00000	.00000	.000	50.409	50.409
18.400	18.909	.021	.00000	.00000	.000	50.409	50.409
23.000	18.909	.021	.00000	.00000	.000	50.409	50.409
27.600	18.909	.021	.00000	.00000	.000	50.409	50.409
32.200	18.909	.021	.00000	.00000	.000	50.409	50.409
36.800	18.909	.021	.00000	.00000	.000	50.409	50.409
41.400	18.909	.021	.00000	.00000	.000	50.409	50.409
46.000	18.909	.021	.00000	.00000	.000	50.409	50.409
50.600	18.909	.021	.00000	.00000	.000	50.409	50.409
55.200	18.909	.021	.00000	.00000	.000	50.409	50.409
59.800	18.909	.021	.00000	.00000	.000	50.409	50.409
64.400	18.909	.021	.00000	.00000	.000	50.409	50.409
69.000	18.909	.021	.00000	.00000	.000	50.409	50.409
73.600	18.909	.021	.00000	.00000	.000	50.409	50.409
78.200	18.909	.021	.00000	.00000	.000	50.409	50.409
82.800	18.909	.021	.00000	.00000	.000	50.409	50.409
87.400	18.909	.021	.00000	.00000	.000	50.409	50.409
92.000	18.909	.021	.00000	.00000	.000	50.409	50.409

CRITICAL SLOPE, FT/FT = .0045

CRITICAL DEPTH, FEET = .17
CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 50.409
HYDRAULIC GRADE = 50.409

A360

180 TUNE IN AEARATION BASIN

"K" LOSS IN RECTANGULAR CONDUIT

WIDTH = 44.00 FEET
INVERT ELEV. = 31.500 FEET
SIDEWALL = 24.50 FEET
LOSS COEFFICIENT "K" = .60

VELOCITY = .02 FT/SEC
ENERGY LOSS, FEET = .000
ENERGY GRADE = 50.409
HYDRAULIC GRADE = 50.409

A370

WEIR #3 IN AEARATION BASIN

SHARP-CRESTED WEIR

WEIR CREST ELEVATION = 49.830
WEIR DISCHARGE = 17.41 CFS
LENGTH = 20.00 FEET

NO END CONTRACTIONS

***** WEIR SUBMERGED *****

CALCULATED C VALUE = 3.331
HEIGHT OF WATER OVER WEIR = .647
ENERGY LOSS, FEET = .068
ENERGY GRADE = 50.477
HYDRAULIC GRADE = 50.477

BROWN AND CALDWELL PROFILE SERIAL NO. 9901
Consulting Engineers Version 2.00

A380

ZONE 3 IN AEARION BASIN

RECTANGULAR CONDUIT

HEIGHT = 24.50 FEET
WIDTH = 23.00 FEET
LENGTH = 92.00 FEET
MANNING ROUGHNESS = .0130
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 31.500

SUBCRITICAL FLOW

STATION	WATER DEPTH	VELOCITY	FRICTION FACTOR	AVERAGE FRICTION FACTOR	FRICTION LOSS	HYDRAULIC	ENERGY
---------	----------------	----------	--------------------	-------------------------------	------------------	-----------	--------

FEET	FEET	FT/SEC	FT/FOOT	FT/FOOT	FEET	GRADE	GRADE
.000	18.977	.040	.00000			50.477	50.477
4.600	18.977	.040	.00000	.00000	.000	50.477	50.477
9.200	18.977	.040	.00000	.00000	.000	50.477	50.477
13.800	18.977	.040	.00000	.00000	.000	50.477	50.477
18.400	18.977	.040	.00000	.00000	.000	50.477	50.477
23.000	18.977	.040	.00000	.00000	.000	50.477	50.477
27.600	18.977	.040	.00000	.00000	.000	50.477	50.477
32.200	18.977	.040	.00000	.00000	.000	50.477	50.477
36.800	18.977	.040	.00000	.00000	.000	50.477	50.477
41.400	18.977	.040	.00000	.00000	.000	50.477	50.477
46.000	18.977	.040	.00000	.00000	.000	50.477	50.477
50.600	18.977	.040	.00000	.00000	.000	50.477	50.477
55.200	18.977	.040	.00000	.00000	.000	50.477	50.477
59.800	18.977	.040	.00000	.00000	.000	50.477	50.477
64.400	18.977	.040	.00000	.00000	.000	50.477	50.477
69.000	18.977	.040	.00000	.00000	.000	50.477	50.477
73.600	18.977	.040	.00000	.00000	.000	50.477	50.477
78.200	18.977	.040	.00000	.00000	.000	50.477	50.477
82.800	18.977	.040	.00000	.00000	.000	50.477	50.477
87.400	18.977	.040	.00000	.00000	.000	50.477	50.477
92.000	18.977	.040	.00000	.00000	.000	50.477	50.477

CRITICAL SLOPE, FT/FT = .0040

CRITICAL DEPTH, FEET = .26

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000

ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 50.477

HYDRAULIC GRADE = 50.477

A390

180 TURN IN AERATION BASIN

"K" LOSS IN RECTANGULAR CONDUIT

WIDTH = 23.00 FEET

INVERT ELEV. = 31.500 FEET

SIDEWALL = 24.50 FEET

LOSS COEFFICIENT "K" = .60

VELOCITY = .04 FT/SEC

ENERGY LOSS, FEET = .000

ENERGY GRADE = 50.477

HYDRAULIC GRADE = 50.477

A400

WEIR #2 IN AERATION BASIN

SHARP-CRESTED WEIR

WEIR CREST ELEVATION = 50.180

WEIR DISCHARGE = 17.41 CFS

LENGTH = 20.00 FEET

NO END CONTRACTIONS

***** WEIR SUBMERGED *****

CALCULATED C VALUE = 3.331
 HEIGHT OF WATER OVER WEIR = .480
 ENERGY LOSS, FEET = .183
 ENERGY GRADE = 50.660
 HYDRAULIC GRADE = 50.660

BROWN AND CALDWELL
 Consulting Engineers

PROFILE
 Version 2.00

SERIAL NO. 9901

A410

ZONE #2 IN AERATION BASIN

RECTANGULAR CONDUIT

HEIGHT = 24.50 FEET
 WIDTH = 24.00 FEET
 LENGTH = 92.00 FEET
 MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 31.500

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	19.160	.038	.00000			50.660	50.660
4.600	19.160	.038	.00000	.00000	.000	50.660	50.660
9.200	19.160	.038	.00000	.00000	.000	50.660	50.660
13.800	19.160	.038	.00000	.00000	.000	50.660	50.660
18.400	19.160	.038	.00000	.00000	.000	50.660	50.660
23.000	19.160	.038	.00000	.00000	.000	50.660	50.660
27.600	19.160	.038	.00000	.00000	.000	50.660	50.660
32.200	19.160	.038	.00000	.00000	.000	50.660	50.660
36.800	19.160	.038	.00000	.00000	.000	50.660	50.660
41.400	19.160	.038	.00000	.00000	.000	50.660	50.660
46.000	19.160	.038	.00000	.00000	.000	50.660	50.660
50.600	19.160	.038	.00000	.00000	.000	50.660	50.660
55.200	19.160	.038	.00000	.00000	.000	50.660	50.660
59.800	19.160	.038	.00000	.00000	.000	50.660	50.660
64.400	19.160	.038	.00000	.00000	.000	50.660	50.660
69.000	19.160	.038	.00000	.00000	.000	50.660	50.660
73.600	19.160	.038	.00000	.00000	.000	50.660	50.660
78.200	19.160	.038	.00000	.00000	.000	50.660	50.660
82.800	19.160	.038	.00000	.00000	.000	50.660	50.660
87.400	19.160	.038	.00000	.00000	.000	50.660	50.660
92.000	19.160	.038	.00000	.00000	.000	50.660	50.660

CRITICAL SLOPE, FT/FT = .0040

CRITICAL DEPTH, FEET = .25

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000

ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 50.660
HYDRAULIC GRADE = 50.660

A420

180 TURN IN AERATION BASIN

"K" LOSS IN RECTANGULAR CONDUIT

WIDTH = 23.00 FEET

INVERT ELEV. = 31.500 FEET

SIDEWALL = 24.50 FEET

LOSS COEFFICIENT "K" = .60

VELOCITY = .04 FT/SEC

ENERGY LOSS, FEET = .000

ENERGY GRADE = 50.660

HYDRAULIC GRADE = 50.660

A430

WEIR #1 IN AERATION BASIN

SHARP-CRESTED WEIR

WEIR CREST ELEVATION = 48.000

WEIR DISCHARGE = 17.41 CFS

LENGTH = 20.00 FEET

NO END CONTRACTIONS

***** WEIR SUBMERGED *****

CALCULATED C VALUE = 3.347

HEIGHT OF WATER OVER WEIR = 2.661

ENERGY LOSS, FEET = .001

ENERGY GRADE = 50.661

HYDRAULIC GRADE = 50.661

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A450

ZONE#1 IN AERATION BASIN

RECTANGULAR CONDUIT

HEIGHT = 24.50 FEET

WIDTH = 8.00 FEET

LENGTH = 42.00 FEET

MANNING ROUGHNESS = .0130

SLOPE = .00000 FEET/FOOT

NUMBER OF ANALYSIS SECTIONS = 20.00

INVERT ELEV AT OUTLET = 47.790

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	2.862	.760	.00002			50.652	50.661
2.100	2.862	.760	.00002	.00002	.000	50.652	50.661
4.200	2.862	.760	.00002	.00002	.000	50.652	50.661

6.300	2.862	.760	.00002	.00002	.000	50.652	50.661
8.400	2.862	.760	.00002	.00002	.000	50.652	50.661
10.500	2.862	.760	.00002	.00002	.000	50.652	50.661
12.600	2.862	.760	.00002	.00002	.000	50.652	50.661
14.700	2.862	.760	.00002	.00002	.000	50.652	50.661
16.800	2.862	.760	.00002	.00002	.000	50.652	50.661
18.900	2.862	.760	.00002	.00002	.000	50.652	50.661
21.000	2.862	.760	.00002	.00002	.000	50.652	50.661
23.100	2.862	.760	.00002	.00002	.000	50.652	50.661
25.200	2.862	.760	.00002	.00002	.000	50.652	50.661
27.300	2.862	.760	.00002	.00002	.000	50.652	50.661
29.400	2.862	.760	.00002	.00002	.000	50.652	50.661
31.500	2.862	.760	.00002	.00002	.000	50.652	50.661
33.600	2.862	.760	.00002	.00002	.000	50.652	50.661
35.700	2.863	.760	.00002	.00002	.000	50.653	50.661
37.800	2.863	.760	.00002	.00002	.000	50.653	50.662
39.900	2.863	.760	.00002	.00002	.000	50.653	50.662
42.000	2.863	.760	.00002	.00002	.000	50.653	50.662

CRITICAL SLOPE, FT/FT = .0036

CRITICAL DEPTH, FEET = .53

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .001

ENERGY LOSS, FEET = .001

INLET CONDITIONS:

ENERGY GRADE = 50.662

HYDRAULIC GRADE = 50.653

F80

HALF FLOW WITH NO RAS NO RECYCLE

FLOW PERCENT

FLOW = 11.49 CFS OR 7.43 MGD

33.00 PERCENT OF TOTAL PLANT FLOW.

A460

30" PIPE ENTRANCE

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 1.000

PIPE DIAMETER = 30.00 INCHES

INVERT ELEVATION = 47.790

VELOCITY = 2.34 FT/SEC

ENERGY LOSS, FEET = .085

ENERGY GRADE = 50.747

HYDRAULIC GRADE = 50.662

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A470

30" PIPE BETWEEN PRIM BASIN AND AERATION BASIN

ROUND CONDUIT

DIAMETER = 30.00 INCHES

LENGTH = 10.00 FEET

MANNING ROUGHNESS = .0130

SLOPE = .00000 FEET/FOOT

NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 47.790

SUBCRITICAL FLOW
CONDUIT OUTLET SUBMERGED
FULL CONDUIT FLOW THROUGHOUT LENGTH
FRICTION FACTOR = .00078 FT/FT
VELOCITY = 2.3 FT/SEC
CRITICAL SLOPE, FT/FT = .0048
CRITICAL DEPTH, FEET = 1.11
CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .008
ENERGY LOSS, FEET = .008

INLET CONDITIONS:
ENERGY GRADE = 50.755
HYDRAULIC GRADE = 50.669

A473
45 TURN IN 30" PIPE
"K" LOSS IN RECTANGULAR CONDUIT
WIDTH = 2.50 FEET
INVERT ELEV. = 47.790 FEET
SIDEWALL = 2.50 FEET
LOSS COEFFICIENT "K" = .20

FULL FLOW IN RECTANGULAR CONDUIT
VELOCITY = 1.84 FT/SEC
ENERGY LOSS, FEET = .010
ENERGY GRADE = 50.765
HYDRAULIC GRADE = 50.713

A477
30" PIPE BETWEEN PRIM CLR AND AERATION BASIN
ROUND CONDUIT
DIAMETER = 30.00 INCHES
LENGTH = 15.00 FEET
MANNING ROUGHNESS = .0130
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 47.790

SUBCRITICAL FLOW
CONDUIT OUTLET SUBMERGED
FULL CONDUIT FLOW THROUGHOUT LENGTH
FRICTION FACTOR = .00078 FT/FT
VELOCITY = 2.3 FT/SEC
CRITICAL SLOPE, FT/FT = .0048
CRITICAL DEPTH, FEET = 1.11
CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .012
ENERGY LOSS, FEET = .012

INLET CONDITIONS:
ENERGY GRADE = 50.777
HYDRAULIC GRADE = 50.692

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A480

30" PIPE ENTRANCE AFTER PRIM CLR
"K" LOSS IN RECTANGULAR CONDUIT
WIDTH = 2.50 FEET
INVERT ELEV. = 47.790 FEET
SIDEWALL = 2.50 FEET
LOSS COEFFICIENT "K" = .50

FULL FLOW IN RECTANGULAR CONDUIT
VELOCITY = 1.84 FT/SEC
ENERGY LOSS, FEET = .026
ENERGY GRADE = 50.803
HYDRAULIC GRADE = 50.751

A490

DROP BOX AFTER PRIM CLR
RECTANGULAR CONDUIT
HEIGHT = 7.00 FEET
WIDTH = 5.00 FEET
LENGTH = 2.50 FEET
MANNING ROUGHNESS = .0130
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 47.790

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	3.004	.765	.00003			50.794	50.803
.125	3.004	.765	.00003	.00003	.000	50.794	50.803
.250	3.004	.765	.00003	.00003	.000	50.794	50.803
.375	3.004	.765	.00003	.00003	.000	50.794	50.803
.500	3.004	.765	.00003	.00003	.000	50.794	50.803
.625	3.004	.765	.00003	.00003	.000	50.794	50.803
.750	3.004	.765	.00003	.00003	.000	50.794	50.803
.875	3.004	.765	.00003	.00003	.000	50.794	50.803
1.000	3.004	.765	.00003	.00003	.000	50.794	50.803
1.125	3.004	.765	.00003	.00003	.000	50.794	50.803
1.250	3.004	.765	.00003	.00003	.000	50.794	50.803
1.375	3.004	.765	.00003	.00003	.000	50.794	50.803
1.500	3.004	.765	.00003	.00003	.000	50.794	50.803
1.625	3.004	.765	.00003	.00003	.000	50.794	50.803
1.750	3.004	.765	.00003	.00003	.000	50.794	50.803
1.875	3.004	.765	.00003	.00003	.000	50.794	50.803
2.000	3.004	.765	.00003	.00003	.000	50.794	50.803
2.125	3.004	.765	.00003	.00003	.000	50.794	50.803
2.250	3.004	.765	.00003	.00003	.000	50.794	50.803
2.375	3.004	.765	.00003	.00003	.000	50.794	50.803
2.500	3.004	.765	.00003	.00003	.000	50.794	50.803

CRITICAL SLOPE, FT/FT = .0039
 CRITICAL DEPTH, FEET = .55
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 50.803
 HYDRAULIC GRADE = 50.794

A500

EFFLUENT LAUNDER IN PRIMARY CLR

RECTANGULAR LAUNDER

UPSTREAM WIDTH = 2.50 FEET
 DOWNSTREAM WIDTH = 2.50 FEET
 LAUNDER SIDEWALL HEIGHT = 2.00 FEET
 LENGTH = 186.92 FEET
 MANNINGS ROUGHNESS = .0130 FEET
 SLOPE = .00000 FEET/FOOT
 INVERT ELEV AT OUTLET = 51.300
 DISCHARGE AT OUTLET = 3.71 MGD

FREE FALL OUTLET CONDITION

STATION	DELTA DEPTH ASSUMED	WATER DEPTH	FLOW CFS	VELOCITY FT/SEC	MOMENTUM DELTA DEPTH	FRICTION LOSS	DELTA DEPTH CALC	HYDRAULIC GRADE	ENERGY GRADE
.00		.394	5.74	5.83				51.694	52.121
9.35	.491	.886	5.46	2.46	.460	.066	.526	52.186	52.280
18.69	.019	.905	5.17	2.28	.023	.010	.032	52.205	52.286
28.04	.018	.923	4.88	2.12	.020	.008	.028	52.223	52.292
37.38	.016	.938	4.60	1.96	.018	.007	.025	52.238	52.298
46.73	.014	.953	4.31	1.81	.016	.006	.022	52.253	52.304
56.08	.013	.966	4.02	1.66	.014	.005	.019	52.266	52.309
65.42	.012	.978	3.73	1.53	.013	.004	.017	52.278	52.314
74.77	.011	.989	3.45	1.39	.011	.003	.015	52.289	52.319
84.11	.010	.998	3.16	1.27	.010	.003	.013	52.298	52.323
93.46	.009	1.007	2.87	1.14	.009	.002	.011	52.307	52.327
102.81	.008	1.015	2.58	1.02	.008	.002	.010	52.315	52.331
112.15	.007	1.021	2.30	.90	.007	.001	.008	52.321	52.334
121.50	.006	1.027	2.01	.78	.006	.001	.007	52.327	52.337
130.84	.005	1.032	1.72	.67	.005	.001	.006	52.332	52.339
140.19	.004	1.036	1.44	.55	.004	.001	.005	52.336	52.341
149.54	.003	1.040	1.15	.44	.003	.000	.004	52.340	52.343
158.88	.003	1.043	.86	.33	.003	.000	.003	52.343	52.344
168.23	.002	1.044	.57	.22	.002	.000	.002	52.344	52.345
177.57	.001	1.046	.29	.11	.001	.000	.001	52.346	52.346
186.92	.000	1.046	.00	.00				52.346	52.346

CRITICAL DEPTH, FEET = .55

WATER DEPTH AT UPSTREAM END OF LAUNDER = 1.05

CHANGE IN HYDRAULIC GRADE WITHIN LAUNDER = .652

ENERGY LOSS, FEET = 1.543

A510

WEIR PLATE IN PRIMARY CLR

V-NOTCH WEIR PLATE

WEIR: DISCHARGE = 11.49 CFS
LENGTH = 747.69 FEET
TOP OF PLATE ELEV = 54.000
V-NOTCH: SPACING = 6.00 INCHES
ANGLE = 90.00 DEGREES
DEPTH = 2.00 INCHES
INVERT = 53.833
WS ELEV DOWNSTREAM OF WEIR = 52.346

FREEBOARD = 1.487
ENERGY LOSS, FEET = 1.586
ENERGY GRADE = 53.932
HYDRAULIC GRADE = 53.932

A520

ENTRANCE IN PRIM CLR

SUBMERGED ROUND ORIFICE

NO OF ORIFICES = 1
ORIFICE DIAMETER = 30.00 INCHES
DISCHARGE COEFFICIENT = 1.00

FLOW PER ORIFICE = 11.49 CFS
VELOCITY THROUGH ORIFICE, FPS = 2.34
ENERGY LOSS, FEET = .085
ENERGY GRADE = 54.017
HYDRAULIC GRADE = 54.017

A540

30" ELBOW UNDER PRIM CLR

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .600
PIPE DIAMETER = 30.00 INCHES
INVERT ELEVATION = 32.000

VELOCITY = 2.34 FT/SEC
ENERGY LOSS, FEET = .051
ENERGY GRADE = 54.068
HYDRAULIC GRADE = 53.983

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A550

30" PIPE FROM PRIM DIST BOX #1 TO PRIM CLR

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 30.0000 INCHES
ROUGHNESS = .0060 FEET
LENGTH = 10.0000 FEET

VELOCITY, FPS = 2.34
REYNOLDS NUMBER = 480760.
DARCY-WEISBACH FRICTION FACTOR = .0254

EQUIVALENT HAZEN WILLIAMS C = 108.
EQUIVALENT MANNING COEFFICIENT = .0137
ENERGY LOSS, FEET = .009
ENERGY GRADE = 54.077
HYDRAULIC GRADE = 53.992

A552

45 TURN IN 30" PIPE

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .800
PIPE DIAMETER = 30.00 INCHES
INVERT ELEVATION = 49.000

VELOCITY = 2.34 FT/SEC
ENERGY LOSS, FEET = .068
ENERGY GRADE = 54.145
HYDRAULIC GRADE = 54.060

A556

30" PIPE BETWEEN DISTR BOX AND PRIM CLR

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 30.0000 INCHES
ROUGHNESS = .0060 FEET
LENGTH = 75.0000 FEET

VELOCITY, FPS = 2.34
REYNOLDS NUMBER = 480760.
DARCY-WEISBACH FRICTION FACTOR = .0254
EQUIVALENT HAZEN WILLIAMS C = 108.
EQUIVALENT MANNING COEFFICIENT = .0137
ENERGY LOSS, FEET = .065
ENERGY GRADE = 54.210
HYDRAULIC GRADE = 54.125

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A560

30" PIPE EXIT FROM DIST BOX #1

"K" LOSS IN RECTANGULAR CONDUIT

WIDTH = 2.50 FEET
INVERT ELEV. = 49.000 FEET
SIDEWALL = 2.50 FEET
LOSS COEFFICIENT "K" = 1.00

FULL FLOW IN RECTANGULAR CONDUIT

VELOCITY = 1.84 FT/SEC
ENERGY LOSS, FEET = .052
ENERGY GRADE = 54.262
HYDRAULIC GRADE = 54.210

A565

CHANNEL AFTER WEIR IN DIST BOX #1

RECTANGULAR CONDUIT

HEIGHT = 12.50 FEET
WIDTH = 5.00 FEET
LENGTH = 5.00 FEET

MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 49.000

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICITION FACTOR FT/FOOT	AVERAGE FRICITION FACTOR FT/FOOT	FRICITION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	5.259	.437	.00001			54.259	54.262
.250	5.259	.437	.00001	.00001	.000	54.259	54.262
.500	5.259	.437	.00001	.00001	.000	54.259	54.262
.750	5.259	.437	.00001	.00001	.000	54.259	54.262
1.000	5.259	.437	.00001	.00001	.000	54.259	54.262
1.250	5.259	.437	.00001	.00001	.000	54.259	54.262
1.500	5.259	.437	.00001	.00001	.000	54.259	54.262
1.750	5.259	.437	.00001	.00001	.000	54.259	54.262
2.000	5.259	.437	.00001	.00001	.000	54.259	54.262
2.250	5.259	.437	.00001	.00001	.000	54.259	54.262
2.500	5.259	.437	.00001	.00001	.000	54.259	54.262
2.750	5.259	.437	.00001	.00001	.000	54.259	54.262
3.000	5.259	.437	.00001	.00001	.000	54.259	54.262
3.250	5.259	.437	.00001	.00001	.000	54.259	54.262
3.500	5.259	.437	.00001	.00001	.000	54.259	54.262
3.750	5.259	.437	.00001	.00001	.000	54.259	54.262
4.000	5.259	.437	.00001	.00001	.000	54.259	54.262
4.250	5.259	.437	.00001	.00001	.000	54.259	54.262
4.500	5.259	.437	.00001	.00001	.000	54.259	54.262
4.750	5.259	.437	.00001	.00001	.000	54.259	54.262
5.000	5.259	.437	.00001	.00001	.000	54.259	54.262

CRITICAL SLOPE, FT/FT = .0039
 CRITICAL DEPTH, FEET = .55
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 54.262
 HYDRAULIC GRADE = 54.259

A570

WEIR IN DIST BOX #1

SHARP-CRESTED WEIR

WEIR CREST ELEVATION = 56.750
 WEIR DISCHARGE = 11.49 CFS
 LENGTH = 12.00 FEET

NO END CONTRACTIONS

FREEBOARD = 2.491
 CALCULATED C VALUE = 3.332
 HEIGHT OF WATER OVER WEIR = .435
 ENERGY LOSS, FEET = 2.923

ENERGY GRADE = 57.185
HYDRAULIC GRADE = 57.185

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

F70

FULL FLOW THROUGH EAST SIDE

FLOW PERCENT

FLOW = 22.98 CFS OR 14.85 MGD
66.00 PERCENT OF TOTAL PLANT FLOW.

A580

FIRST CHANNEL IN DIST BOX #1

RECTANGULAR CONDUIT

HEIGHT = 11.92 FEET

WIDTH = 16.00 FEET

LENGTH = 16.00 FEET

MANNING ROUGHNESS = .0130

SLOPE = .00000 FEET/FOOT

NUMBER OF ANALYSIS SECTIONS = 20.00

INVERT ELEV AT OUTLET = 47.330

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	9.855	.146	.00000			57.185	57.185
.800	9.855	.146	.00000	.00000	.000	57.185	57.185
1.600	9.855	.146	.00000	.00000	.000	57.185	57.185
2.400	9.855	.146	.00000	.00000	.000	57.185	57.185
3.200	9.855	.146	.00000	.00000	.000	57.185	57.185
4.000	9.855	.146	.00000	.00000	.000	57.185	57.185
4.800	9.855	.146	.00000	.00000	.000	57.185	57.185
5.600	9.855	.146	.00000	.00000	.000	57.185	57.185
6.400	9.855	.146	.00000	.00000	.000	57.185	57.185
7.200	9.855	.146	.00000	.00000	.000	57.185	57.185
8.000	9.855	.146	.00000	.00000	.000	57.185	57.185
8.800	9.855	.146	.00000	.00000	.000	57.185	57.185
9.600	9.855	.146	.00000	.00000	.000	57.185	57.185
10.400	9.855	.146	.00000	.00000	.000	57.185	57.185
11.200	9.855	.146	.00000	.00000	.000	57.185	57.185
12.000	9.855	.146	.00000	.00000	.000	57.185	57.185
12.800	9.855	.146	.00000	.00000	.000	57.185	57.185
13.600	9.855	.146	.00000	.00000	.000	57.185	57.185
14.400	9.855	.146	.00000	.00000	.000	57.185	57.185
15.200	9.855	.146	.00000	.00000	.000	57.185	57.185
16.000	9.855	.146	.00000	.00000	.000	57.185	57.185

CRITICAL SLOPE, FT/FT = .0036

CRITICAL DEPTH, FEET = .40

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000

ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 57.185

HYDRAULIC GRADE = 57.185

A585

48" PIPE EXIT INTO DIST BOX #1

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 2.500

PIPE DIAMETER = 48.00 INCHES

INVERT ELEVATION = 47.330

VELOCITY = 1.83 FT/SEC

ENERGY LOSS, FEET = .130

ENERGY GRADE = 57.315

HYDRAULIC GRADE = 57.263

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A590

48" PIPE FROM AERATED GRIT CHAM TO DIST BOX #1

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 48.0000 INCHES

ROUGHNESS = .0100 FEET

LENGTH = 1470.0000 FEET

VELOCITY, FPS = 1.83

REYNOLDS NUMBER = 600950.

DARCY-WEISBACH FRICTION FACTOR = .0256

EQUIVALENT HAZEN WILLIAMS C = 105.

EQUIVALENT MANNING COEFFICIENT = .0148

ENERGY LOSS, FEET = .489

ENERGY GRADE = 57.804

HYDRAULIC GRADE = 57.752

A595

ALL TURNS IN 48" BETWEEN GRIT CHAM AND DISTR BOX

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 8.000

PIPE DIAMETER = 48.00 INCHES

INVERT ELEVATION = 47.330

VELOCITY = 1.83 FT/SEC

ENERGY LOSS, FEET = .415

ENERGY GRADE = 58.220

HYDRAULIC GRADE = 58.168

A600

48" PIPE ENTRANCE AFTER AERATED GRIT CHAM

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 1.800

PIPE DIAMETER = 48.00 INCHES

INVERT ELEVATION = 45.250

VELOCITY = 1.83 FT/SEC

ENERGY LOSS, FEET = .093
 ENERGY GRADE = 58.313
 HYDRAULIC GRADE = 58.261

BROWN AND CALDWELL
 Consulting Engineers

PROFILE
 Version 2.00

SERIAL NO. 9901

A610

FINAL CHAN IN AERATED GRIT CHAM
 RECTANGULAR CONDUIT

HEIGHT = 15.75 FEET
 WIDTH = 10.00 FEET
 LENGTH = 34.00 FEET
 MANNING ROUGHNESS = .0450
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 44.200

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	14.113	.163	.00000			58.313	58.313
1.700	14.113	.163	.00000	.00000	.000	58.313	58.313
3.400	14.113	.163	.00000	.00000	.000	58.313	58.313
5.100	14.113	.163	.00000	.00000	.000	58.313	58.313
6.800	14.113	.163	.00000	.00000	.000	58.313	58.313
8.500	14.113	.163	.00000	.00000	.000	58.313	58.313
10.200	14.113	.163	.00000	.00000	.000	58.313	58.313
11.900	14.113	.163	.00000	.00000	.000	58.313	58.313
13.600	14.113	.163	.00000	.00000	.000	58.313	58.313
15.300	14.113	.163	.00000	.00000	.000	58.313	58.313
17.000	14.113	.163	.00000	.00000	.000	58.313	58.313
18.700	14.113	.163	.00000	.00000	.000	58.313	58.313
20.400	14.113	.163	.00000	.00000	.000	58.313	58.313
22.100	14.113	.163	.00000	.00000	.000	58.313	58.313
23.800	14.113	.163	.00000	.00000	.000	58.313	58.313
25.500	14.113	.163	.00000	.00000	.000	58.313	58.313
27.200	14.113	.163	.00000	.00000	.000	58.313	58.313
28.900	14.113	.163	.00000	.00000	.000	58.313	58.313
30.600	14.113	.163	.00000	.00000	.000	58.313	58.313
32.300	14.113	.163	.00000	.00000	.000	58.313	58.313
34.000	14.113	.163	.00000	.00000	.000	58.313	58.313

CRITICAL SLOPE, FT/FT = .0414
 CRITICAL DEPTH, FEET = .55
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 58.313
 HYDRAULIC GRADE = 58.313

F80

1/3 FLOW THROUGH EASTSIDE

FLOW PERCENT

FLOW = 7.66 CFS OR 4.95 MGD
22.00 PERCENT OF TOTAL PLANT FLOW.

A620

90 TURN IN AERATED GRIT CHAM

"K" LOSS IN RECTANGULAR CONDUIT

WIDTH = 17.00 FEET
INVERT ELEV. = 45.250 FEET
SIDEWALL = 17.30 FEET
LOSS COEFFICIENT "K" = .40

VELOCITY = .03 FT/SEC
ENERGY LOSS, FEET = .000
ENERGY GRADE = 58.313
HYDRAULIC GRADE = 58.313

BROWN AND CALDWELL

PROFILE

SERIAL NO. 9901

Consulting Engineers

Version 2.00

A640

WEIR AFTER AERATED GRIT CHAM

SHARP-CRESTED WEIR

WEIR CREST ELEVATION = 58.750
WEIR DISCHARGE = 7.66 CFS
LENGTH = 2.50 FEET

NO END CONTRACTIONS
FREEBOARD = .437
CALCULATED C VALUE = 3.334
HEIGHT OF WATER OVER WEIR = .945
ENERGY LOSS, FEET = 1.382
ENERGY GRADE = 59.695
HYDRAULIC GRADE = 59.695

A650

CHANNEL IN AERATED GRIT TANK

RECTANGULAR CONDUIT

HEIGHT = 17.30 FEET
WIDTH = 17.00 FEET
LENGTH = 54.00 FEET
MANNING ROUGHNESS = .0200
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 44.200

SUBCRITICAL FLOW

STATION	WATER		FRICTION	AVERAGE	FRICTION		ENERGY
FEET	DEPTH	VELOCITY	FACTOR	FRICTION	LOSS	HYDRAULIC	GRADE
	FEET	FT/SEC	FT/FOOT	FT/FOOT	FEET	GRADE	

.000	15.495	.029	.00000			59.695	59.695
2.700	15.495	.029	.00000	.00000	.000	59.695	59.695
5.400	15.495	.029	.00000	.00000	.000	59.695	59.695
8.100	15.495	.029	.00000	.00000	.000	59.695	59.695
10.800	15.495	.029	.00000	.00000	.000	59.695	59.695
13.500	15.495	.029	.00000	.00000	.000	59.695	59.695
16.200	15.495	.029	.00000	.00000	.000	59.695	59.695
18.900	15.495	.029	.00000	.00000	.000	59.695	59.695
21.600	15.495	.029	.00000	.00000	.000	59.695	59.695
24.300	15.495	.029	.00000	.00000	.000	59.695	59.695
27.000	15.495	.029	.00000	.00000	.000	59.695	59.695
29.700	15.495	.029	.00000	.00000	.000	59.695	59.695
32.400	15.495	.029	.00000	.00000	.000	59.695	59.695
35.100	15.495	.029	.00000	.00000	.000	59.695	59.695
37.800	15.495	.029	.00000	.00000	.000	59.695	59.695
40.500	15.495	.029	.00000	.00000	.000	59.695	59.695
43.200	15.495	.029	.00000	.00000	.000	59.695	59.695
45.900	15.495	.029	.00000	.00000	.000	59.695	59.695
48.600	15.495	.029	.00000	.00000	.000	59.695	59.695
51.300	15.495	.029	.00000	.00000	.000	59.695	59.695
54.000	15.495	.029	.00000	.00000	.000	59.695	59.695

CRITICAL SLOPE, FT/FT = .0105

CRITICAL DEPTH, FEET = .19

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000

ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 59.695

HYDRAULIC GRADE = 59.695

A670

36" PIPE ENTRANCE TO AERATED GRIT CHAM

"K" LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = 1.000

PIPE DIAMETER = 36.00 INCHES

INVERT ELEVATION = 51.000

VELOCITY = 1.08 FT/SEC

ENERGY LOSS, FEET = .018

ENERGY GRADE = 59.713

HYDRAULIC GRADE = 59.695

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A690

36" PIPE IN AERATED GRIT TANK

DARCY-WEISBACH FRICTION

PIPE DIAMETER = 36.0000 INCHES

ROUGHNESS = .0025 FEET

LENGTH = 72.0000 FEET

VELOCITY, FPS = 1.08

REYNOLDS NUMBER = 267089.

DARCY-WEISBACH FRICTION FACTOR = .0204

EQUIVALENT HAZEN WILLIAMS C = 127.
EQUIVALENT MANNING COEFFICIENT = .0126
ENERGY LOSS, FEET = .009
ENERGY GRADE = 59.722
HYDRAULIC GRADE = 59.704

A690

2 45 TURNS IN 36" PIPE

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .400
PIPE DIAMETER = 36.00 INCHES
INVERT ELEVATION = 51.000

VELOCITY = 1.08 FT/SEC
ENERGY LOSS, FEET = .007
ENERGY GRADE = 59.730
HYDRAULIC GRADE = 59.711

A700

36" PIPE ENTRANCE IN AERATED GRIT CHAM

"K"LOSS IN FULL ROUND PIPE

LOSS COEFFICIENT K = .500
PIPE DIAMETER = 36.00 INCHES
INVERT ELEVATION = 51.500

VELOCITY = 1.08 FT/SEC
ENERGY LOSS, FEET = .009
ENERGY GRADE = 59.739
HYDRAULIC GRADE = 59.721

BROWN AND CALDWELL
Consulting Engineers

PROFILE
Version 2.00

SERIAL NO. 9901

A705

WEIR IN BEGIN OF AERATED GRIT TANK

SHARP-CRESTED WEIR

WEIR CREST ELEVATION = 60.500
WEIR DISCHARGE = 7.66 CFS
LENGTH = 3.00 FEET

NO END CONTRACTIONS
FREEBOARD = .779
CALCULATED C VALUE = 3.336
HEIGHT OF WATER OVER WEIR = .837
ENERGY LOSS, FEET = 1.598
ENERGY GRADE = 61.337
HYDRAULIC GRADE = 61.337

F100

FULL FLOW

FLOW PERCENT

FLOW = 22.98 CFS OR 14.85 MGD
66.00 PERCENT OF TOTAL PLANT FLOW.

A720

CHAMBER IN AERATED GRIT CHAM
RECTANGULAR CONDUIT

HEIGHT = 10.00 FEET
 WIDTH = 10.00 FEET
 LENGTH = 5.00 FEET
 MANNING ROUGHNESS = .0130
 SLOPE = .00000 FEET/FOOT
 NUMBER OF ANALYSIS SECTIONS = 20.00
 INVERT ELEV AT OUTLET = 51.500

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	9.836	.234	.00000			61.336	61.337
.250	9.836	.234	.00000	.00000	.000	61.336	61.337
.500	9.836	.234	.00000	.00000	.000	61.336	61.337
.750	9.836	.234	.00000	.00000	.000	61.336	61.337
1.000	9.836	.234	.00000	.00000	.000	61.336	61.337
1.250	9.836	.234	.00000	.00000	.000	61.336	61.337
1.500	9.836	.234	.00000	.00000	.000	61.336	61.337
1.750	9.836	.234	.00000	.00000	.000	61.336	61.337
2.000	9.836	.234	.00000	.00000	.000	61.336	61.337
2.250	9.836	.234	.00000	.00000	.000	61.336	61.337
2.500	9.836	.234	.00000	.00000	.000	61.336	61.337
2.750	9.836	.234	.00000	.00000	.000	61.336	61.337
3.000	9.836	.234	.00000	.00000	.000	61.336	61.337
3.250	9.836	.234	.00000	.00000	.000	61.336	61.337
3.500	9.836	.234	.00000	.00000	.000	61.336	61.337
3.750	9.836	.234	.00000	.00000	.000	61.336	61.337
4.000	9.836	.234	.00000	.00000	.000	61.336	61.337
4.250	9.836	.234	.00000	.00000	.000	61.336	61.337
4.500	9.836	.234	.00000	.00000	.000	61.336	61.337
4.750	9.836	.234	.00000	.00000	.000	61.336	61.337
5.000	9.836	.234	.00000	.00000	.000	61.336	61.337

CRITICAL SLOPE, FT/FT = .0035
 CRITICAL DEPTH, FEET = .55
 CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000
 ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 61.337
 HYDRAULIC GRADE = 61.336

BROWN AND CALDWELL
 Consulting Engineers

PROFILE
 Version 2.00

SERIAL NO. 9901

A725

4.5 FT CHAN OPENING

"K" LOSS IN RECTANGULAR CONDUIT

WIDTH = 4.50 FEET

INVERT ELEV. = 51.500 FEET

SIDEWALL = 9.75 FEET

LOSS COEFFICIENT "K" = 1.00

FULL FLOW IN RECTANGULAR CONDUIT

VELOCITY = .52 FT/SEC
ENERGY LOSS, FEET = .004
ENERGY GRADE = 61.341
HYDRAULIC GRADE = 61.337

A730

90 TURN IN AERATED GRIT CHAM

"K" LOSS IN RECTANGULAR CONDUIT

WIDTH = 10.00 FEET
INVERT ELEV. = 51.500 FEET
SIDEWALL = 10.00 FEET
LOSS COEFFICIENT "K" = .30

VELOCITY = .23 FT/SEC
ENERGY LOSS, FEET = .000
ENERGY GRADE = 61.341
HYDRAULIC GRADE = 61.340

A740

FIRST CHANNEL IN GRIT CHAM

RECTANGULAR CONDUIT

HEIGHT = 9.75 FEET
WIDTH = 16.00 FEET
LENGTH = 8.00 FEET
MANNING ROUGHNESS = .0130
SLOPE = .00000 FEET/FOOT
NUMBER OF ANALYSIS SECTIONS = 20.00
INVERT ELEV AT OUTLET = 51.750

SUBCRITICAL FLOW

STATION FEET	WATER DEPTH FEET	VELOCITY FT/SEC	FRICTION FACTOR FT/FOOT	AVERAGE FRICTION FACTOR FT/FOOT	FRICTION LOSS FEET	HYDRAULIC GRADE	ENERGY GRADE
.000	9.591	.150	.00000			61.341	61.341
.400	9.591	.150	.00000	.00000	.000	61.341	61.341
.800	9.591	.150	.00000	.00000	.000	61.341	61.341
1.200	9.591	.150	.00000	.00000	.000	61.341	61.341
1.600	9.591	.150	.00000	.00000	.000	61.341	61.341
2.000	9.591	.150	.00000	.00000	.000	61.341	61.341
2.400	9.591	.150	.00000	.00000	.000	61.341	61.341
2.800	9.591	.150	.00000	.00000	.000	61.341	61.341
3.200	9.591	.150	.00000	.00000	.000	61.341	61.341
3.600	9.591	.150	.00000	.00000	.000	61.341	61.341
4.000	9.591	.150	.00000	.00000	.000	61.341	61.341
4.400	9.591	.150	.00000	.00000	.000	61.341	61.341
4.800	9.591	.150	.00000	.00000	.000	61.341	61.341
5.200	9.591	.150	.00000	.00000	.000	61.341	61.341
5.600	9.591	.150	.00000	.00000	.000	61.341	61.341
6.000	9.591	.150	.00000	.00000	.000	61.341	61.341
6.400	9.591	.150	.00000	.00000	.000	61.341	61.341

6.800	9.591	.150	.00000	.00000	.000	61.341	61.341
7.200	9.591	.150	.00000	.00000	.000	61.341	61.341
7.600	9.591	.150	.00000	.00000	.000	61.341	61.341
8.000	9.591	.150	.00000	.00000	.000	61.341	61.341

CRITICAL SLOPE, FT/FT = .0036

CRITICAL DEPTH, FEET = .40

CHANGE IN HYDRAULIC GRADE WITHIN CONDUIT, FEET = .000

ENERGY LOSS, FEET = .000

INLET CONDITIONS:

ENERGY GRADE = 61.341

HYDRAULIC GRADE = 61.341

THERESA STREET WWTP
EAST SIDE 1971
LINCOLN

MARK RICHARDS
8/13/01

22.50 44.77 44.77

0

F10

FULL FLOW THROUGH PLANT

2

100.00, 0.00,

A10

OUTFALL AT SALT CREEK

5

48.00, 1, 24.50, 0.00,

A20

48" PIPE FROM JB TO OUTFALL

4

48.00, 0.0025, 100.00, 0.00,

A30

EXIT FROM JB

5

48.00, 0.5, 30.00, 0.00,

A40

JUNCTION BOX BEFORE CREEK

12

20.00, 6.00, 16.00, 4.00, 0.013, 0,
30.00, 1.00,

F15

FULL FLOW FROM BOTH TRAINS

2

100.00, 0.00,

A50

ENTRANCE INTO JB

5

48.00, 2.2, 37.00, 0.00,

A60

48" PIPE FROM CHL TANK TO JB

4

48.00, 0.0055, 15.00, 0.00,

A63

90 TURN IN PIPE

5

48.00, 0.55, 37.00, 0.00,

A67

48" PIPE BETWEEN CHL AND JB

4	48.00,	0.0055,	20.00,	0.00,
---	--------	---------	--------	-------

A70

48" EXIT FROM CHL TANK

5	48.00,	1.5,	37.00,	0.00,
---	--------	------	--------	-------

A80

FINAL CHANNEL IN CHL TANK

12	20.00,	25.00,	9.60,	7.00,	0.013,	0,
	37.00,	1.00,				

F20

1/2 TOTAL FLOW THROUGH CHL TANK

2	50.00,	0.00,
---	--------	-------

A85

SHARP CRESETED WEIR IN CHR TANK

3	5.00,	45.33,	0.00,	36.00,	0.00,
---	-------	--------	-------	--------	-------

A90

4TH PASS IN CHL TANK

12	20.00,	50.00,	10.60,	10.00,	0.013,	0,
	36.00,	0.00,				

A100

180 TURN IN CHL TANK

16	0.6,	10.00,	36.00,	1.00,	10.60,	0.00,
----	------	--------	--------	-------	--------	-------

A110

3RD PASS IN CHL TANK

12	20.00,	50.00,	10.60,	29.50,	0.013,	0,
	36.00,	0.00,				

A120

180 TURN IN CHL TANK

16	0.6,	29.50,	36.00,	0.00,	10.60,	0.00,
----	------	--------	--------	-------	--------	-------

A130

2ND PASS IN CHL TANK

12	20.00,	50.00,	10.60,	29.50,	0.013,	0,
	36.00,	0.00,				

A140

180 TURN IN CHL TANK

16	0.6,	29.50,	36.00,	1.00,	10.60,	0.00,
----	------	--------	--------	-------	--------	-------

A150

1ST PASS IN CHL TANK

12

20.00,	50.00,	10.60,	29.50,	0.013,	0,
36.00,	1.00,				

A155

90 TURN IN CHL

16

2,	29.50,	36.00,	0.00,	10.60,	0.00,
----	--------	--------	-------	--------	-------

A170

SUB ORIFICE IN CHL TANK (?)

18

1.00,	4.00,	4.00,	0.47,	0.00,
-------	-------	-------	-------	-------

F30

FULL FLOW IN CHL TANK

2

100.00,	0.00,
---------	-------

A180

FIRST CHANNEL IN CHL TANK

12

20.00,	16.00,	15.50,	8.00,	0.013,	0,
31.00,	1.00,				

A185

60" ENTRANCE INTO CHL TANK

5

60.00,	3,	31.00,	0.00,
--------	----	--------	-------

A190

60" PIPE BETWEEN DIST BOX AND CHL TANK

4

60.00,	0.006,	55.00,	0.00,
--------	--------	--------	-------

A200

60" PIPE EXIT FROM DIST BOX

5

60.00,	2.3,	31.00,	0.00,
--------	------	--------	-------

F30

FULL FLOW WITH 1965 TRAIN

2

100.00,	0.00,
---------	-------

A210

DIST BOX #2

12

20.00,	8.00,	27.00,	8.00,	0.02,	0,
31.00,	1.00,				

F40

1/2 FLOW THROUGH PRC TRAIN 1971

2

33.00, 0.00,

A230

30" ENTRANCE INTO DISTR BOX #2

5

30.00, 0.5, 41.79, 0.00,

A240

30" PIPE FROM FINAL BASIN TO DISTR BOX#2

4

30.00, 0.002, 25.00, 0.00,

A250

30" PIPE ENTRANCE AFTER FINAL CLR

5

30.00, 0.2, 41.79, 0.00,

A255

DROP BOX AFTER FINAL CLR

12

20.00, 3.00, 7.47, 7.00, 0.01, 0,
42.03, 1.00,

A260

COLLECTION LAUNDER IN FINAL CHL

7

30.00, 194.80, 2.50, 2.50, 2.00, 0.01,
0, 45.80, 0.50, 0.00, 1.00,

A270

WEIR PLATE IN FINAL CHL

8

389.56, 6.00, 90.00, 48.00, 2.00, 1.00,

F67

1/2 FLOW WITH 1/2 RAS

2

50.00, 0.00,

A280

30" PIPE OPENING

5

30.00, 1, 28.92, 0.00,

A300

90 DEGREE ELBOW UNDER FINAL CHL

5

30.00, 0.6, 28.92, 0.00,

A302

30" PIPE FROM AERATION BASIN TO FINAL CLR

4

30.00, 0.0042, 80.00, 0.00,

A310

30" ENTRANCE AFTER AERATION BASIN

5

	30.00,	0.5,	31.51,	0.00,		
A320						
MIXED LIQUOR CH IN AERATION BASIN						
12						
	20.00,	56.00,	24.50,	3.00,	0.013,	0,
	31.50,	1.00,				
A330						
180 TURN IN AERATION						
16						
	0.6,	44.00,	47.79,	0.00,	24.50,	0.00,
A340						
WEIR #4 IN AERATION						
3						
	20.00,	50.00,	0.00,	31.50,	0.00,	
A350						
ZONE #4 IN AERATION BASIN						
12						
	20.00,	92.00,	24.50,	44.00,	0.013,	0,
	31.50,	0.00,				
A360						
180 TURN IN AERATION BASIN						
16						
	0.6,	44.00,	31.50,	0.00,	24.50,	0.00,
A370						
WEIR #3 IN AERATION BASIN						
3						
	20.00,	49.83,	0.00,	31.50,	0.00,	
A380						
ZONE 3 IN AERATION BASIN						
12						
	20.00,	92.00,	24.50,	23.00,	0.013,	0,
	31.50,	1.00,				
A390						
180 TURN IN AERATION BASIN						
16						
	0.6,	23.00,	31.50,	0.00,	24.50,	0.00,
A400						
WEIR #2 IN AERATION BASIN						
3						
	20.00,	50.18,	0.00,	31.50,	0.00,	
A410						
ZONE #2 IN AERATION BASIN						
12						
	20.00,	92.00,	24.50,	24.00,	0.013,	0,
	31.50,	0.00,				
A420						

180 TURN IN AERATION BASIN

16
0.6, 23.00, 31.50, 0.00, 24.50, 0.00,

A430

WEIR #1 IN AERATION BASIN

3
20.00, 48.00, 0.00, 31.50, 0.00,

A450

ZONE#1 IN AERATION BASIN

12
20.00, 42.00, 24.50, 8.00, 0.013, 0,
47.79, 1.00,

F80

HALF FLOW WITH NO RAS NO RECYCLE

2
33.00, 0.00,

A460

30" PIPE ENTRANCE

5
30.00, 1, 47.79, 0.00,

A470

30" PIPE BETWEEN PRIM BASIN AND AERATION BASIN

12
20.00, 10.00, 30.00, 0.00, 0.013, 0,
47.79, 0.00,

A473

45 TURN IN 30" PIPE

16
0.2, 2.50, 47.79, 0.00, 2.50, 0.00,

A477

30" PIPE BETWEEN PRIM CLR AND AERATION BASIN

12
20.00, 15.00, 30.00, 0.00, 0.013, 0,
47.79, 0.00,

A480

30" PIPE ENTRANCE AFTER PRIM CLR

16
0.5, 2.50, 47.79, 0.00, 2.50, 0.00,

A490

DROP BOX AFTER PRIM CLR

12
20.00, 2.50, 7.00, 5.00, 0.013, 0,
47.79, 1.00,

A500

EFFLUENT LAUNDER IN PRIMARY CLR

7

0,	20.00,	186.92,	2.50,	2.50,	2.00,	0.013,
	51.30,	0.50,	0.00,	1.00,		

A510

WEIR PLATE IN PRIMARY CLR

8

747.69,	6.00,	90.00,	54.00,	2.00,	1.00,
---------	-------	--------	--------	-------	-------

A520

ENTRANCE IN PRIM CLR

18

1.00,	30.00,	0.00,	1,	0.00,
-------	--------	-------	----	-------

A540

30" ELBOW UNDER PRIM CLR

5

30.00,	0.6,	32.00,	0.00,
--------	------	--------	-------

A550

30" PIPE FROM PRIM DIST BOX #1 TO PRIM CLR

4

30.00,	0.006,	10.00,	0.00,
--------	--------	--------	-------

A552

45 TURN IN 30" PIPE

5

30.00,	0.8,	49.00,	0.00,
--------	------	--------	-------

A556

30" PIPE BETWEEN DISTR BOX AND PRIM CLR

4

30.00,	0.006,	75.00,	0.00,
--------	--------	--------	-------

A560

30" PIPE EXIT FROM DIST BOX #1

16

1,	2.50,	49.00,	0.00,	2.50,	0.00,
----	-------	--------	-------	-------	-------

A565

CHANNEL AFTER WEIR IN DIST BOX #1

12

20.00,	5.00,	12.50,	5.00,	0.013,	0,
49.00,	1.00,				

A570

WEIR IN DIST BOX #1

3

12.00,	56.75,	0.00,	49.00,	0.00,
--------	--------	-------	--------	-------

F70

FULL FLOW THROUGH EAST SIDE

2

66.00,	0.00,
--------	-------

A580

FIRST CHANNEL IN DIST BOX #1

12

	20.00,	16.00,	11.92,	16.00,	0.013,	0,
47.33,	1.00,					

A585

48" PIPE EXIT INTO DIST BOX #1

5

48.00,	2.5,	47.33,	0.00,
--------	------	--------	-------

A590

48" PIPE FROM AERATED GRIT CHAM TO DIST BOX #1

4

48.00,	0.01,	1470.00,	0.00,
--------	-------	----------	-------

A595

ALL TURNS IN 48" BETWEEN GRIT CHAM AND DISTR BOX

5

48.00,	8,	47.33,	0.00,
--------	----	--------	-------

A600

48" PIPE ENTRANCE AFTER AERATED GRIT CHAM

5

48.00,	1.8,	45.25,	0.00,
--------	------	--------	-------

A610

FINAL CHAN IN AERATED GRIT CHAM

12

20.00,	34.00,	15.75,	10.00,	0.045,	0,
44.20,	1.00,				

F80

1/3 FLOW THROUGH EASTSIDE

2

22.00,	0.00,
--------	-------

A620

90 TURN IN AERATED GRIT CHAM

16

0.4,	17.00,	45.25,	0.00,	17.30,	0.00,
------	--------	--------	-------	--------	-------

A640

WEIR AFTER AERATED GRIT CHAM

3

2.50,	58.75,	0.00,	45.25,	0.00,
-------	--------	-------	--------	-------

A650

CHANNEL IN AERATED GRIT TANK

12

20.00,	54.00,	17.30,	17.00,	0.02,	0,
44.20,	1.00,				

A670

36" PIPE ENTRANCE TO AERATED GRIT CHAM

5

36.00,	1,	51.00,	0.00,
--------	----	--------	-------

A690

36" PIPE IN AERATED GRIT TANK

4
36.00, 0.0025, 72.00, 0.00,

A690
2 45 TURNS IN 36" PIPE

5
36.00, 0.4, 51.00, 0.00,

A700
36" PIPE ENTRANCE IN AERATED GRIT CHAM

5
36.00, 0.5, 51.50, 0.00,

A705
WEIR IN BEGIN OF AERATED GRIT TANK

3
3.00, 60.50, 0.00, 51.50, 0.00,

F100
FULL FLOW

2
66.00, 0.00,

A720
CHAMBER IN AERATED GRIT CHAM

12
20.00, 5.00, 10.00, 10.00, 0.013, 0,
51.50, 0.00,

A725
4.5 FT CHAN OPENING

16
1, 4.50, 51.50, 0.00, 9.75, 0.00,

A730
90 TURN IN AERATED GRIT CHAM

16
0.3, 10.00, 51.50, 0.00, 10.00, 0.00,

A740
FIRST CHANNEL IN GRIT CHAM

12
20.00, 8.00, 9.75, 16.00, 0.013, 0,
51.75, 1.00,

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\EASTSIDE.sum
 BBBBBB CC Data file: C:\PROFIL~2\EASTSIDE.pro
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC EAST SIDE 1971
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By: MARK RICHARDS

PLANT FLOW = 34.81 CFS OR 22.50 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A740	FIRST CHANNEL IN GRIT CHAM	61.34	61.34
A650	CHANNEL IN AERATED GRIT TANK	59.70	59.70
A610	FINAL CHAN IN AERATED GRIT CHA	58.31	58.31
A580	FIRST CHANNEL IN DIST BOX #1	57.19	57.19
A565	CHANNEL AFTER WEIR IN DIST BOX	54.26	54.26
A510	WEIR PLATE IN PRIMARY CLR FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	53.93 1.49 53.83	53.93
A500	EFFLUENT LAUNDER IN PRIMARY CL	52.35	52.35
A490	DROP BOX AFTER PRIM CLR	50.79	50.80
A450	ZONE#1 IN AEARATION BASIN	50.65	50.66
A380	ZONE 3 IN AEARION BASIN	50.48	50.48
A320	MIXED LIQUOR CH IN AERATION BA	48.51	48.52
A270	WEIR PLATE IN FINAL CHL FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	47.96 .95 47.83	47.96
A260	COLLECTION LAUNDER IN FINAL CH	46.88	46.88

A255	DROP BOX AFTER FINAL CLR	46.81	46.81
A210	DIST BOX #2	46.73	46.73
A180	FIRST CHANNEL IN CHL TANK	46.46	46.46
A150	1ST PASS IN CHL TANK	46.38	46.38
A80	FINAL CHANNEL IN CHL TANK	45.53	45.53
A40	JUNCTION BOX BEFORE CREEK	45.00	45.00

BBBB CCC BROWN AND CALDWELL
 BBBB CCCC Consulting Engineers
 BB BB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BB CC CC Version 2.00
 BBBB CC
 BBBB CC File name: C:\PROFIL~2\NE_GRI~3.SUM
 BBBB CC Data file: C:\PROFIL~2\NE_GRI~3.PRO
 BB BB CC CC NORTHEAST WWTP
 BB BB CC CC FROM PARSHALL FLUME TO PS BEFORE TOWER
 BB BB CC CC LINCOLN
 BBBB CCCC
 BBBB CCC 8/14/01 By: MARK RICHARDS

PLANT FLOW = 30.94 CFS OR 20.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 33.00 FEET
 HYDRAULIC GRADE = 33.00 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A260	CHANNEL BEFORE PARSHALL FLUME	43.50	43.91
A250	CHANNEL DOWNSTREAM OF PARSHALL	41.25	41.25
A240	LARGE CHANNEL IN AERATED GRIT	41.24	41.24
A230	WEIR IN AERATED GRIT TANK	41.24	41.24
	WS DOWNSTREAM OF WEIR	39.84	
	TOP OF WEIR	40.75	
A210	SHORT CHANNEL IN AERATED GRIT	39.84	39.84
A130	WIER IN PRIM CLR	39.74	39.74
	FREE DISCHARGE, FREEBOARD	1.15	
	V-NOTCH INVERT	39.61	
A110	DROP BOX AFTER PRIM CLR	33.06	33.08

BBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBB CC File name: C:\PROFIL~2\NE_GRI~4.SUM
 BBBBBB CC Data file: C:\PROFIL~2\NEED3D~1.PRO
 BB BBB CC CC NORTHEAST WWTP
 BB BB CC CC FROM PARSHALL FLUME TO PS BEFORE TOWER
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBB CCC 8/14/01 By:MARK RICHARDS

PLANT FLOW = 54.15 CFS OR 35.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 33.00 FEET
 HYDRAULIC GRADE = 33.00 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A260	CHANNEL BEFORE PARSHALL FLUME	44.65	45.05
A250	CHANNEL DOWNSTREAM OF PARSHALL	41.49	41.50
A240	LARGE CHANNEL IN AERATED GRIT	41.46	41.46
A230	WEIR IN AERATED GRIT TANK	41.46	41.46
	WS DOWNSTREAM OF WEIR	40.08	
	TOP OF WEIR	40.75	
A210	SHORT CHANNEL IN AERATED GRIT	40.08	40.08
A130	WIER IN PRIM CLR	39.77	39.77
	FREE DISCHARGE, FREEBOARD	.58	
	V-NOTCH INVERT	39.61	
A110	DROP BOX AFTER PRIM CLR	33.17	33.24

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\NEF121~1.SUM
 BBBBBB CC Data file: C:\PROFIL~2\NE_GRI~4.PRO
 BB BBB CC CC NORTHEAST WWTP
 BB BB CC CC FROM PARSHALL FLUME TO PS BEFORE TOWER
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/14/01 By: MARK RICHARDS

PLANT FLOW = 77.36 CFS OR 50.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 33.00 FEET
 HYDRAULIC GRADE = 33.00 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A260	CHANNEL BEFORE PARSHALL FLUME	45.42	46.06
A250	CHANNEL DOWNSTREAM OF PARSHALL	41.72	41.73
A240	LARGE CHANNEL IN AERATED GRIT	41.65	41.65
A230	WEIR IN AERATED GRIT TANK	41.65	41.65
	WS DOWNSTREAM OF WEIR	40.42	
	TOP OF WEIR	40.75	
A210	SHORT CHANNEL IN AERATED GRIT	40.42	40.42
A130	WIER IN PRIM CLR	39.81	39.81
	FREE DISCHARGE, FREEBOARD	.10	
	V-NOTCH INVERT	39.61	
A110	DROP BOX AFTER PRIM CLR	33.37	33.49

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\NE_GRI~2.SUM
 BBBBBB CC Data file: C:\PROFIL~2\NE_GRI~2.PRO
 BB BBB CC CC NORTHEAST WWTP
 BB BB CC CC FROM PARSHALL FLUME TO PS BEFORE TOWER
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/14/01 By:MARK RICHARDS

PLANT FLOW = 12.38 CFS OR 8.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 33.00 FEET
 HYDRAULIC GRADE = 33.00 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A260	CHANNEL BEFORE PARSHALL FLUME	42.78	43.03
A250	CHANNEL DOWNSTREAM OF PARSHALL	41.02	41.02
A240	LARGE CHANNEL IN AERATED GRIT	41.02	41.02
A230	WEIR IN AERATED GRIT TANK	41.02	41.02
	WS DOWNSTREAM OF WEIR	39.72	
	TOP OF WEIR	40.75	
A210	SHORT CHANNEL IN AERATED GRIT	39.72	39.72
A130	WIER IN PRIM CLR	39.70	39.70
	FREE DISCHARGE, FREEBOARD	1.71	
	V-NOTCH INVERT	39.61	
A110	DROP BOX AFTER PRIM CLR	33.01	33.01

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\NE_GRI~1.SUM
 BBBBBB CC Data file: C:\PROFIL~2\NE_GRI~1.PRO
 BB BBB CC CC NORTHEAST WWTP
 BB BB CC CC FROM PARSHALL FLUME TO PS BEFORE TOWER
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/14/01 By: MARK RICHARDS

PLANT FLOW = 24.76 CFS OR 16.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 33.00 FEET
 HYDRAULIC GRADE = 33.00 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A260	CHANNEL BEFORE PARSHALL FLUME	43.21	43.62
A250	CHANNEL DOWNSTREAM OF PARSHALL	41.18	41.18
A240	LARGE CHANNEL IN AERATED GRIT	41.17	41.17
A230	WEIR IN AERATED GRIT TANK	41.17	41.17
	WS DOWNSTREAM OF WEIR	39.79	
	TOP OF WEIR	40.75	
A210	SHORT CHANNEL IN AERATED GRIT	39.79	39.79
A130	WIER IN PRIM CLR	39.73	39.73
	FREE DISCHARGE, FREEBOARD	1.32	
	V-NOTCH INVERT	39.61	
A110	DROP BOX AFTER PRIM CLR	33.04	33.05

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\WESTSI~2.SUM
 BBBBBB CC Data file: C:\PROFIL~2\WESTSI~1.PRO
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC WEST SIDE 1965
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By: MARK RICHARDS

PLANT FLOW = 15.47 CFS OR 10.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A720	CHAMBER IN AERATED GRIT CHAM	60.91	60.91
A610	FINAL CHAN IN AERATED GRIT CHA	57.57	57.57
A510	WEIR PLATE IN PRIMARY CLR FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	57.42 1.07 57.28	57.42
A500	EFFLUENT LAUNDER IN PRIMARY CL	56.21	56.21
A490	DROP BOX AFTER PRIM CLR	53.86	53.87
A459	CHANNEL IN JUCNTION BOX	53.71	53.71
A450	ZONE#1 IN AEARATION BASIN	53.63	53.63
A320	EFFLUENT CH IN AERATION BASIN	49.92	49.92
A304	CHANNEL IN DISTR BOX	49.63	49.63
A270	WEIR PLATE IN FINAL CHL FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	49.22 1.56 49.13	49.22
A265	COLLECTION LAUNDER IN FINAL CH	47.56	47.56
A260	DROP BOX AFTER FINAL CLR	47.47	47.47
A255	JUNCTION MANHOLE #1	47.42	47.42

A219	JUNCTION BOX #2	47.39	47.39
A215	JUNCTION BOX #3	47.39	47.39
A210	DIST BOX #2	47.38	47.38
A180	FIRST CHANNEL IN CHL TANK	46.90	46.90
A150	1ST PASS IN CHL TANK	46.75	46.75
A80	FINAL CHANNEL IN CHL TANK	46.12	46.13
A40	JUNCTION BOX BEFORE CREEK	45.18	45.18

BBBB CCC BROWN AND CALDWELL
 BBBB CCCC Consulting Engineers
 BB BB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BB CC CC Version 2.00
 BBBB CC
 BBBB CC File name: C:\PROFIL~2\WESTSI~3.SUM
 BBBB CC Data file: C:\PROFIL~2\WESTSI~2.PRO
 BB BB CC CC THERESA STREET WWTP
 BB BB CC CC WEST SIDE 1965
 BB BB CC CC LINCOLN
 BBBB CCCC
 BBBB CCC 8/13/01 By: MARK RICHARDS

PLANT FLOW = 19.34 CFS OR 12.50 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A720	CHAMBER IN AERATED GRIT CHAM	60.98	60.98
A610	FINAL CHAN IN AERATED GRIT CHA	57.66	57.66
A510	WEIR PLATE IN PRIMARY CLR FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	57.43 .97 57.28	57.43
A500	EFFLUENT LAUNDER IN PRIMARY CL	56.31	56.31
A490	DROP BOX AFTER PRIM CLR	54.13	54.13
A459	CHANNEL IN JUCNTION BOX	53.89	53.89
A450	ZONE#1 IN AEARATION BASIN	53.76	53.76
A320	EFFLUENT CH IN AERATION BASIN	50.32	50.32
A304	CHANNEL IN DISTR BOX	49.87	49.87
A270	WEIR PLATE IN FINAL CHL FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	49.22 .68 49.13	49.22
A265	COLLECTION LAUNDER IN FINAL CH	48.44	48.44
A260	DROP BOX AFTER FINAL CLR	48.41	48.41
A255	JUNCTION MANHOLE #1	48.33	48.33

A219	JUNCTION BOX #2	48.29	48.29
A215	JUNCTION BOX #3	48.28	48.28
A210	DIST BOX #2	48.27	48.27
A180	FIRST CHANNEL IN CHL TANK	47.52	47.52
A150	1ST PASS IN CHL TANK	47.29	47.29
A80	FINAL CHANNEL IN CHL TANK	46.88	46.89
A40	JUNCTION BOX BEFORE CREEK	45.40	45.42

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\WESTSI~1.SUM
 BBBBBB CC Data file: C:\PROFIL~2\WESTSI~3.PRO
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC WEST SIDE 1965
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By: MARK RICHARDS

PLANT FLOW = 23.21 CFS OR 15.00 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A720	CHAMBER IN AERATED GRIT CHAM	61.06	61.06
A610	FINAL CHAN IN AERATED GRIT CHA	57.77	57.77
A510	WEIR PLATE IN PRIMARY CLR FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	57.43 .85 57.28	57.43
A500	EFFLUENT LAUNDER IN PRIMARY CL	56.42	56.42
A490	DROP BOX AFTER PRIM CLR	54.41	54.42
A459	CHANNEL IN JUCNTION BOX	54.07	54.07
A450	ZONE#1 IN AEARATION BASIN	53.88	53.88
A320	EFFLUENT CH IN AERATION BASIN	51.27	51.27
A304	CHANNEL IN DISTR BOX	50.61	50.62
A270	WEIR PLATE IN FINAL CHL WEIR SUBMERGED, W.S. DS V-NOTCH INVERT	49.69 49.69 49.13	49.69
A265	COLLECTION LAUNDER IN FINAL CH	49.69	49.69
A260	DROP BOX AFTER FINAL CLR	49.67	49.67
A255	JUNCTION MANHOLE #1	49.55	49.55

A219	JUNCTION BOX #2	49.49	49.49
A215	JUNCTION BOX #3	49.48	49.48
A210	DIST BOX #2	49.46	49.47
A180	FIRST CHANNEL IN CHL TANK	48.38	48.39
A150	1ST PASS IN CHL TANK	48.05	48.05
A80	FINAL CHANNEL IN CHL TANK	47.80	47.82
A40	JUNCTION BOX BEFORE CREEK	45.68	45.70

BBBBBB CCC BROWN AND CALDWELL
 BBBBBB CCCCC Consulting Engineers
 BB BBB CCC CCC
 BB BB CC CC PROFILE SERIAL NO. 9901
 BB BBB CC CC Version 2.00
 BBBBBB CC
 BBBBBB CC File name: C:\PROFIL~2\WESTSIDE.sum
 BBBBBB CC Data file: C:\PROFIL~2\WESTSIDE.pro
 BB BBB CC CC THERESA STREET WWTP
 BB BB CC CC WEST SIDE 1965
 BB BBB CC CC LINCOLN
 BBBBBB CCCCC
 BBBBBB CCC 8/13/01 By: MARK RICHARDS

PLANT FLOW = 11.60 CFS OR 7.50 MGD

DOWNSTREAM CONDITIONS:

ENERGY GRADE = 44.77 FEET
 HYDRAULIC GRADE = 44.77 FEET

ELEMENT	DESCRIPTION	HYDRAULIC GRADE	ENERGY GRADE
A720	CHAMBER IN AERATED GRIT CHAM	60.83	60.83
A610	FINAL CHAN IN AERATED GRIT CHA	57.50	57.50
A510	WEIR PLATE IN PRIMARY CLR FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	57.41 1.16 57.28	57.41
A500	EFFLUENT LAUNDER IN PRIMARY CL	56.11	56.11
A490	DROP BOX AFTER PRIM CLR	53.63	53.64
A459	CHANNEL IN JUCNTION BOX	53.55	53.55
A450	ZONE#1 IN AEARATION BASIN	53.50	53.50
A320	EFFLUENT CH IN AERATION BASIN	49.60	49.60
A304	CHANNEL IN DISTR BOX	49.44	49.44
A270	WEIR PLATE IN FINAL CHL FREE DISCHARGE, FREEBOARD V-NOTCH INVERT	49.21 1.61 49.13	49.21
A265	COLLECTION LAUNDER IN FINAL CH	47.52	47.52
A260	DROP BOX AFTER FINAL CLR	46.78	46.78
A255	JUNCTION MANHOLE #1	46.75	46.75

A219	JUNCTION BOX #2	46.74	46.74
A215	JUNCTION BOX #3	46.74	46.74
A210	DIST BOX #2	46.73	46.73
A180	FIRST CHANNEL IN CHL TANK	46.46	46.46
A150	1ST PASS IN CHL TANK	46.38	46.38
A80	FINAL CHANNEL IN CHL TANK	45.53	45.53
A40	JUNCTION BOX BEFORE CREEK	45.00	45.00